THE EFFECTS OF FIRST AID TRAINING ON SAFETY: A FIELD STUDY OF APPROACHES AND METHODS

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SUMMARY

The research tested the major hypothesis derived from Canadian research that: training in first aid reduces people's injury accident rate. It also investigated the causal relationship between first aid training and injury accident rate.

The thesis contains a critique of four Canadian projects. It describes the development of a research design based on before-and-after measurements of injury accidents and attitudes in matched experimental and control groups. Studies were carried out in three factories (A, B and C), the first acting as a pilot study of the research techniques and the first aid training package.

Interview schedules were developed to measure; knowledge of and attitude towards first aid, awareness of danger and of risk-taking, perceived personal responsibility for injury causation and prevention, awareness of safe behaviour, and motivation to adopt safe behaviour.

The research plan called for systematic variations to be introduced at Factories B and C into the training package which was based on a four-hour emergency first aid course. In the event the course proved poorly conceived and variable in its execution. Major changes introduced to overcome these fundamental shortcomings masked the effect of the systematic variations in the overall package.

The major hypothesis was confirmed at Factory C and a similar trend was found at Factory B. Interview data indicated that first aid training influenced trainees' perception of their personal responsibility for accident prevention and their motivation to avoid injury. It was concluded that first aid training motivated trainees to be safer but that additional training was necessary to impart the knowledge on how to avoid danger.

It is recommended that further research should be directed towards developing a package including both first aid and safety training, and towards further clarification of the causal relationship between first aid training and injury rate.

FIRST AID

TRAINING

INJURY ACCIDENT

ATTITUDE

SAFETY

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CONTENTS

PART IV: DEVELOPMENT OF METHODOLOGY

PART V: THE STUDIES AT FACTORIES B AND C

PART VI: CONCLUSIONS

APPENDICES

TABLES

PAGE NO.

FIGURES

PART I: INTRODUCTION AND REVIEW OF THE LITERATURE

CHAPTER 1

INTRODUCTION

INTRODUCTION

This thesis describes three factory studies carried out to test the relationship between first aid training and safety.

It is an established belief of first aid practitioners that trained first aiders are less likely to have accidents than those who have not done first aid training. This belief led the Workmen's Compensation Board of Ontario to sponsor a study in 1970 investigating the effects of first aid training on the community of Orillia in Ontario Canada.

Data from large industries throughout Canada (Miller and Agnew, 1973) showed that people trained in first aid had consistently fewer reported injury accidents than people not trained in first aid.

In the light of the importance of these findings to industrial safety and the difficulty of applying the Canadian results directly to Britain because of differences in culture and social systems, the St. John Ambulance approached the Department of Safety and Hygiene at Aston University with a view to undertaking a similar study in the United Kingdom. It was decided that the British study should be preceded by a study in industry where trainees would be easier to obtain and where injury accident data was both more accessible and more accurate than in a community. It was proposed that the community study would be undertaken at Leek in Staffordshire after the problem had been defined more clearly and methods had been devised in the factory studies.

For the purpose of the study the following major hypothesis was proposed:

'that first aid training reduces people's injury accident rate'.*

The second aim of the study was to establish the manner in which first aid training might affect injury accident rate.

This thesis is an account of the factory studies.

*In this thesis 'injury accident rate' is defined as the number of injury accidents suffered by a person or group of persons during a specified period of time. The term ' injury accident involvement' also appears and is used interchangeably with 'injury accident rate', that is 'involvement' means suffering injury accidents.

CHAPTER 2

THE CANADIAN RESEARCH

THE CANADIAN RESEARCH

INTRODUCTION

Since the research described in this thesis was initiated as a result of the study carried out in Canada by the St. John Ambulance and York University, Toronto and the methods were strongly influenced by it, this chapter will examine in detail the conduct and findings of that study. Subsequent Canadian studies are also described.

To date four Canadian research projects are in progress or have been completed: FACTS I (Orillia), FACTS II, Project LIFE, and FACTS Alberta. FACTS stands for First Aid Community Training for Safety, and LIFE, Learn Industrial First Aid Effectively.

At the beginning of the research being described in this thesis, the only information available from Canada was a preliminary report on FACTS I. Throughout the project, further information has become available of the Canadian research in the form of research reports and publicity releases. Only one scientific paper has been published, that by Agnew and Miller (1973). This publication does not provide complete information on the studies. Attempts made to fill the gaps in information by contacting the Canadian researchers and St. John Ambulance personnel involved in the projects have proved unsuccessful. For this reason the following discussion of the Canadian work is incomplete although it is possible to build a picture of their experimental techniques and general findings.

The most detailed information available is that from FACTS I, the Orillia project. This chapter therefore centres upon a description and critique of that study. Briefer accounts of the subsequent three studies are also included. These studies show refinements in research techniques and help to complete, for example, details of the type of training given by the Canadians.

THE ORILLIA PROJECT (FACTS I)

Introduction

It was stated in 1938 by the Supervising Engineer Safety Division, Bureau of Mines, Washington (St. John Ambulance, 1938) that:

> *'The secondary effect from first aid training has been quite apparent in reducing both the number and the severity of accidents, with the result that additional large financial savings have been made. First aid training in addition to being an emergency measure, becomes a means of accident prevention as well.'*

In an anonymous document (Anon, 1972) describing the Orillia project it was reported that the St. John Ambulance's involvement with the Workmen's Compensation Board led them to realise that first aid training increased safety consciousness. Some companies had reported 40 to 50 per cent drops in injury rate following training.

Checks in Canada, the United States and England showed that no research had been carried out to determine the effects of training on a true cross-section of population. The document stated that an idea began to 'jell', that:

'It could be very important to find out under as close as possible to controlled conditions, what reduction in the cost and incidence of accidents could be obtained by training a whole community in safety-oriented first-aid.'

This was how FACTS (First Aid Community Training for Safety) originated. As the St. John Ambulance budget was insufficient, they sought and obtained the backing of the Workmen's Compensation Board of Ontario and the Industrial Accident Prevention Association (IAPA).

The community of Orillia, Ontario was chosen for the experiment because:

(a) It was of medium size.
(b) It was close enough to Toronto to be supervised from the St. John Provincial Headquarters, but far enough away from Toronto to avoid commuting and a changing labour force.
(c) There was a good cross section of business and industry - without domination by any one firm or major industry.
(d) The community had widespread and various recreational activities both in winter and in summer.

When the plan was first discussed a basic enthusiasm was apparent in those initially involved. Representatives of labour, industry, Chamber of Commerce, public utilities, fire, police, the Mayor and Council, hospital administrators and many others, were interested and prepared to give practical support. Press, radio and the local television station were all behind the plan and the project started in February 1970.

THE METHOD USED AT ORILLIA

(a) Research Methods

A basic shortcoming of the Orillia project was that the research team from York University were not asked by the St. John Ambulance to investigate the relation between first aid training and accident frequency until some time after the training had started and so were unable to take any pre-training measures in the Community. When they were brought in they decided to use a variety of experimental methods and data sources (Miller and Agnew, 1972).

Method 1

An investigation, totally unrelated to Orillia, was made of existing data collected by private industry, relating first aid training to accident frequency. Bell Telephone Company of Canada provided data for 1969 and 1970. The Ontario Northland Railway had detailed data from January 1st to June 30th 1970 and less detailed data for the whole of 1970. It must be stressed that these data were in no way connected with the training in Orillia.

Method 2

Interview surveys were carried out in Orillia in 1970, 1971 and 1972 to investigate the success and popular reactions to the first aid training campaign.

Method 3

Workmen's Compensation Board data relevant to on-the-job accidents for all workers in Ontario from before the training until after the completion of training were available. From these; (a) accident rates in Orillia during and after training could be compared with rates before training, and (b) accident rates for Orillia over the same time period could be compared to accident rates in the rest of the province of Ontario. No results are yet available on these analyses.

(b) The first aid training at Orillia

Details of the training used in Orillia are still not available from research reports. However, an anonymous paper stated that an emergency first aid course was developed to be used in Orillia covering:

How to start breathing

How to stop bleeding

How to deal with an unconscious patient

How to immobilize a fracture

The author stated:

> *'The result was quite a remarkable course. Pupils could be taught and examined in a total of eight hours and it was suitable for anyone over the age of ten years. It could be given to anyone with a minimum disruption of normal activities and at very low cost.'*

A large number of people were also trained on the standard (16 hour) course.* The numbers taking each type of training during FACTS I were as follows:

STANDARD COURSE (16 hours)		1970	1971	1972	TOTAL
(i)	Industry	84	78	43	205
(ii)	Public	120	114	48	282
(iii)	School teachers/instructors	70	60	4	134
		274	252	95	621

EMERGENCY COURSE (8 hours)					
(i)	Industry and retail outlets	1290	792	544	2626
(ii)	Public	95	182	242	519
(iii)	Schools/Youth Groups	171	1021	556	1748
		1556	1995	1342	4893

GRAND TOTAL 5514 in 350 classes

(Table taken from St. John Ambulance - Ontario Council, 1972).

52% of those trained were employed in business or industry. By June 1972 it was decided that an adequate number had been trained to allow the research team to monitor any changes in accident rates.

An indication of the safety content included in the courses is shown in the Instructors' Notes (Appendix 1). Two sets of Instructors' Notes were prepared for delivery verbatim to course members. The first was delivered at the start of the course in order to associate first aid training with accident prevention. The second was prepared for delivery at the start of the third session with the same intention as the first. The paper stressed the importance of off-the-job accidents and safety, describing dangerous situations and indicating what should be done to avoid them. Course members were urged to eliminate hazards and to be safety conscious.

*The 16 hour course was the standard certificated first aid course.

These two sets of notes clearly indicate that the emergency training at Orillia was far from being 'pure' first aid. In fact, safety training was specially developed to be an important part of the course.

(c) <u>Advertising the training</u>

A list of 40 methods used to advertise the courses is included in Appendix 2. These methods included full use of all media, a direct telephone recruiting campaign, and use of churches and other community groups. One week was proclaimed FACTS week by the Mayor. Back up services such as baby-sitting were provided to allow mothers to attend courses.

Donald Rumball (1972) indicated some of the by-products of this massive publicity such as the fact that the phone calls unearthed many lonely people who had not been called for years. He stated:

> *'the cumulative effect of the publicity and enthusiasm swept all before it and the project finished by being <u>far more than an accident prevention campaign</u>.'*

Rumball summed up by saying:

> *'The energy required to make a project FACTS work is too great for it to be applicable on a global scale. It will be interesting to see how much enthusiasm is generated in a far less compact community.'*

It is difficult to distinguish to what extent the publicity was designed to encourage volunteering and to what extent it was intended to emphasise the safety aspect of the training, but it is clear that the people of Orillia were told to make Orillia the safest place in

Canada - by learning first aid, and that the whole town was caught up in the enthusiasm created by the massive publicity campaign that accompanied the training. The effects of the publicity alone were clearly considerable.

The results from FACTS I

The following results are those reported in Agnew and Miller (1973) and Miller and Agnew (1973). It must be noted that the only results from Orillia are those described under Method 2, the surveys. No accident data for Orillia have been published.

Method 1: Industrial Accident Data

Detailed accident data were made available to the research team by Bell Telephone Canada and the Ontario Northland Railway. Further industrial data were also reported, particularly in publicity material used in subsequent Canadian projects.

(i) Bell Telephone

Bell made available data for on- and off-the-job accidents during 1969 and 1970. Staff in the medical and safety departments added information as to whether the victims were trained in first aid or not. 8,936 accident reports were available. The data were then classified by the number of accidents per individual and checked for consistency.

Tables 1 and 2 show the number of first aid trained and non-first aid trained employees observed and expected* for

*'Expected' refers to the number who would be expected to report an accident based on the total number of accidents reported and the number of employees in that group. For example, if 30% of the work-force were trained in first aid they would be expected to have experienced 30% of the total number of reported accidents.

Table 1

NUMBER OF ACCIDENTS SUFFERED BY FIRST AID TRAINED (FA) AND NON-FIRST AID TRAINED (NFA) EMPLOYEES IN BELL CANADA 1969 DATA

No. of Accidents	Sample	No. of FAs Observed	No. of NFAs Observed	Total Number of People Observed	No. of FAs Expected	No. of NFAs Expected	x^2
1	On Job Males	749	938	1687	1008	679	165.3**
1	On Job Females	113	565	678	155	523	14.8**
1	Off Job Males	175	252	427	255	172	62.3**
1	Off Job Females	96	596	692	159	533	32.4**
1	Males	924	1190	2114	1263	851	226.0**
1	Females	209	1161	1370	314	1056	45.6**
1	TOTAL	1133	2351	3484			
2	Males	100	160	260	155	105	48.3**
2	Females	9	90	99	23	76	11.1**
2	TOTAL	109	250	359			
3	Males	14	24	38	23	15	8.9*
3	Females	1	12	13	--	--	---
3	TOTAL	15	36	51			
4	Males	4	2	6	--	--	---
4	Females	0	1	1	--	--	---
4	TOTAL	4	3	7			
5	Males	0	1	1	--	--	---
5	Females	0	3	3	--	--	---
5	TOTAL	0	4	4			
7	Males	0	0	0	--	--	---
7	Females	1	0	1	--	--	---
7	TOTAL	1	0	1	--	--	---

* $p < .005$
** $p < .001$

Table 2

NUMBER OF ACCIDENTS FUFFERED BY FIRST AID TRAINED (FA) AND NON-FIRST AID TRAINED (NFA) EMPLOYEES IN BELL CANADA 1970 DATA

No. of Accidents	Sample	No. of FA's Observed	No. of NFA's Observed	Total No. of People Observed	No. of FA's Expected	No. of NFA's Expected	x^2
1	On Job Males	638	908	1546	940	606	247.7**
1	On Job Females	106	523	629	179	450	41.1**
1	Off Job Males	192	215	407	247	160	31.6**
1	Off Job Females	128	624	752	213	539	47.6**
1	Males	635	1318	1953	1188	765	656.1**
1	Females	219	1162	1381	840	541	106.4**
1	TOTAL	854	2480	3334			
2	Males	137	161	298	181	117	27.6**
2	Females	9	70	79	22	57	11.2**
2	TOTAL	146	231	377			
3	Males	17	25	42	26	16	7.2*
3	Females	1	9	10	3	7	1.7
3	TOTAL	18	34	52			
4	Males	2	1	3			
4	Females	0	2	2			
4	TOTAL	2	3	5			

* $p < .01$
** $p < .001$

individuals reporting 1, 2, 3, 4, 5 or 7 accidents for 1969 and 1970. The data for males and females were analysed separately because of sex differences in accident rate.

The results indicate that those who were first aid trained, both males and females, consistently reported fewer on- and off-the-job accidents than expected.

The authors pointed out some of the problems with these data: The data were correlational and so it was possible that some other variables might account for the results. For example, it was possible to argue that only those individuals interested in safety had volunteered to have first aid training. Thus, first aid trained employees would consistently have fewer accidents because of their attitude towards safety rather than because of the training. The authors stated that a more definitive answer could have been found if individuals had been randomly assigned to take the first aid training.

However, Bell Telephone appear to have been convinced of the value of first aid training. In Bell News (May 4th 1970) Mr. J.V. Leworthy stated:

> *'First aid training does not only equip you with the skills to treat injuries but makes you very aware of the consequences of injuries. If we can create this awareness I am sure we can improve our methods of managing risk and in the long run reducing injuries.'*

In the Annual Report on Project FACTS (1971) it was reported that Bell had changed their first aid policy partly because of the increasing evidence that well-defined first aid programmes in industry have a significant influence on reducing disabling injury rates both on- and off-the-job. As a result Bell embarked upon on-duty first aid training with the aim of training by 1975 all employees with two or more years service.

(ii) Ontario Northland Railway

The research team were provided with tables showing the number of employees in each department, the number of reported accidents for each department and the number of first aid trained and non-first aid trained employees involved in accidents. The tables for the first half of 1970 also indicated whether an accident fell into one of the following three categories: reported only, required medical attention, or involved loss of time from the job.

Tables 3 and 4 show the results from the analyses of the figures. The results provided strong support for the theory that first aid trained employees should have fewer accidents than expected.

The authors stated that the finding of the relationship between first aid training and accident frequency for Ontario Northland Railways employees was interesting for two reasons: firstly, it confirmed the results from Bell Canada; secondly, it made the alternative hypothesis - that volunteers were already safety motivated - less credible. Employees of

Table 3

Number of First Aid (FA) Trained Ontario Northland Railway Employees Having Accidents Between Jan. 1 and June 30, 1970

DEPARTMENT	TYPE OF ACCIDENT											
	MEDICAL ATTENTION			LOST TIME ACCIDENT			REPORTED ONLY			TOTAL		
	No. of FAs observed	No. of FAs expected	x^2	No. of FAs observed	No. of FAs expected	x^2	No. of FAs observed	No. of FAs expected	x^2	No. of FAs observed	No. of FAs expected	x^2
M.P. & Car Dept.	18	22	3.6*	9	11	1.3	20	24	2.7*	40	57	22.0***
Maintenance of Way	1	7	11.1***	0	6	12.3***	0	3	6.4**	1	16	31.2***
TOTALS (All Departments)	31	30	--	16	20	--	24	26	--	60	75	5.1**

* $p < .1$
** $p < .05$
*** $p < .001$

Table 4

Number of First Aid (FA) Trained Ontario Northland Railway Employees Having Accidents in 1970

Department	No. of FAs observed	No. of FAs expected	x^2
M.P. & Car	70	97	33.3*
Maintenance of Way	50	56	1.9
TOTAL	185	317	292.1*

* $p < .001$

Ontario Northland Railways were assigned to receive first aid training (rather than volunteering as at Bell Canada). This allowed more confidence to be placed in these results than in those from Bell Canada.

(iii) <u>Additional Industrial Data</u>

Claims of reduction in accidents, unsubstantiated by research, were made for various other industries as follows:

Nova Scotia Light and Power Company

Accident rate cut by 39% (speech by Lieutenant-General Sir William Pike to the Canadian Club of Toronto, October 23rd, 1972)

Chrysler Canada

Accident rate cut by 22% after first aid training (Sir William Pike, *op cit*)

International Nickel

36.8% reduction in accident rate following training for 24 trainees (Sir William Pike, *op cit*)

Miller and Agnew (1973) in their final report on FACTS I reported that data relating first aid training to on-the-job accidents were being compiled by four additional companies (two of which did not want to be identified). Miller and Agnew stated that the results of these analyses supported the results from Bell Canada and Ontario Northland Railways.

The authors stated:

'While the data from any single industrial setting taken alone could be readily challenged, for the same trend to be consistently in evidence, and clearly so, constitutes significant support for the St. John hypothesis.'

They stated that it was difficult in applied research to make quantitative statements about the possible strength of an association between variables, but it was both interesting and an aid to other investigators to do so.

They tentatively put forward a figure of 30% lower probability of accidents for people trained in first aid as a measure of the strength of relation between first aid training and improved safety. This figure was derived by examining the difference between the number of first aid trained employees expected to have accidents and the actual number of accidents observed for the five sources of industrial data as follows:

TABLE 5

COMPANY	NUMBER OF FIRST AIDERS OBSERVED	NUMBER OF FIRST AIDERS EXPECTED	PERCENTAGE SHORTFALL $\frac{(E - O)^2}{E}$ X 100
Bell Canada	2,401	3,720	35 (Over 3 years)
O.N.R.	341	378	10 (over 2 years)
Company A	45	70	36 (Over 4 months)
Company B	35	46	24 (Over 6 months)
Intern. Nickel*	233	302	23 (Over 11 months)
TOTAL	3,055	4,516	32

PERCENTAGE SHORTFALL OF ACCIDENT INVOLVEMENT OF FIRST AIDERS IN CANADIAN INDUSTRIES

*These figures for International Nickel would appear to be different from those quoted by Sir William Pike (above).

The researchers admitted that this was a crude measure which took little account of accident severity and the 'density' of first aid training within a plant which should obtain in order to effect a given percentage reduction in accidents.

They also pointed out that in many of the settings the figures included any possible volunteering effect.

Method 2: Surveys carried out in Orillia

The second method used to measure the effects of first aid training was interviews carried out in Orillia in 1970, 1971 and 1972. As distinct from Method 1, these interviews were related to the first aid training carried out in Orillia. The interviews carried out in the summer of 1970 were used to test the usefulness of the interview schedule and as such were of minor significance when testing the main hypothesis. No details of the 1972 survey have been published. For these reasons the following discussion reviews the findings of the 1971 study.

Design of the Study

By the summer of 1971 FACTS had been in existence for 18 months. This period was divided into three equal time periods:

January to June 1970 (Time Group 1),
July to December 1970 (Time Group 2), and
January to June 1971 (Time Group 3)

75 trainees who had been trained within each of the time groups were selected for interview. A fourth sample of 75 non-trained people was selected. All four samples were matched 'as far as possible' on such variables as sex and nature of employment. In this way within-group and between-group comparisons could be made.

The 1970 interview schedule was rewritten and changes were made to allow for the group of non-trained interviewees. Two forms of questionnaire were tested for clarity and time required per interview. One form was selected and approved by the St. John Ambulance staff.

Interviewee Sampling

Lists were made up of all trained people in each time period to include only those people trained on the 8 hour FACTS course who were of employable age.

The interview samples were chosen to reflect the proportions by sex and employment status of those trained. Firms were supplied with a list of their employees who had been trained and were asked to make a specified number available to be interviewed. At the same time they were asked to indicate which non-trained people could be interviewed.

The Interviewers

Interviewers were chosen from local people with post-secondary schooling, who were judged by the researchers to be suitable. At the insistence of the St. John Ambulance they took the 8 hour FACTS course before being employed. There was thus a conscious intent to further the publicity of the project in the choice of interviewers (Erlensbusch, 1972).

The interviewers were given one day's training to familiarise themselves with the schedule and to test it out on each other.

Results of the 1971 Study

The interview schedule used in 1971 is in Appendix 3. The following discussion of the results from the 1971 survey is selective. A full discussion is contained in Miller and Agnew (1972). The findings relevant to this study are those on the reasons given for learning first aid, how effective the course was thought to be and the reported effects of the training on safety and accident prevention.

(i) Reasons for enrolment on a FACTS course

The most frequent reason given for taking a course was for the trainees own interests or needs. However, 32% of the males interviewed cited job requirement as a reason for enrolling. Thus it would appear that a majority of trainees were volunteers.

(ii) Course effectiveness

Most respondents reported that their knowledge of first aid increased somewhat or very much following training. Trainees rated their likely effectiveness in handling first aid emergencies higher than those not trained. (However, 78% of the non-trained group considered themselves at least somewhat effective in dealing with emergencies requiring first aid treatment). About 60% of respondents indicated that they had taught some first aid to others and 70% reported that they had encouraged others to participate in the St. John training. The authors suggested that these findings indicated a considerable 'spill over' effect.

(iii) Safety and accident prevention

26% of respondents reported being more or much more careful on-the-job after taking a FACTS course, while about 34% reported being more or much more careful off-the-job. Table A (Appendix 4) shows the type of safety precautions reported following training. An examination of the specific behavioural changes reported, revealed that there was a wide range of responses. The finding that the training seemed to have a bigger impact on off-the-job safety was important because off-the-job benefits were stressed during the FACTS project. The respondents also indicated that some of the trained people they knew became more safety conscious on- and off-the-job.

24% of trainees claimed to use seat belts when driving or riding in cars, compared with 16% of those not trained. Trained respondents were also more likely to wear safety gloves and glasses in appropriate work areas than non-trained respondents. Miller and Agnew noted that the differences, though consistently in the right direction, were not large, and that volunteers for first aid training might already be more safety conscious. However, they counter this with the finding that 24 respondents who had not done so prior to training, claimed to wear seat belts after training.

Another indication that the training may have influenced safety consciousness was that about 12% of the respondents mentioned safety or accident prevention, when asked if they had learnt about anything other than first aid techniques from the course. The authors pointed out that this question was asked before safety was mentioned in the interview. However, the figure of 12% appears low in the light of the amount of safety oriented publicity which accompanied FACTS I and the safety content of the instructors' notes.

Interviews carried out in 1972

A further survey was carried out in 1972, interviews being conducted with 308 people. Details of this survey are still not available although it is claimed (Miller and Agnew, 1973) that the findings supported those of the 1971 survey.

Conclusions from the surveys

Miller and Agnew claimed that improved safety attitudes were found but that these were not accompanied by appropriate behaviour such as wearing safety gloves, safety glasses and car seat belts. They stated:

> *'The results...imply that it is much easier to elicit verbal responses about safety than to change safety relevant behaviour....Although there is no readily discernible change in safety oriented behaviour as a result of the training, it is still possible that first aid trained people become more aware of safety and thus will have lower accident rates.'*

Method 3: Workmen's Compensation Board Data

The third measure of the effectiveness of first aid training was from the Workmen's Compensation Board data. Itwas reported in the preliminary report on FACTS I *(op cit)* that accident frequencies would be calculated by month from 1964 to 1972 to compare changes in accident frequency in Orillia with the rest of Ontario. The analysis would be repeated for every type of injury.

When these data were complete the authors claimed that they would be able to trace accident frequency and accident cost for each type of industry in Orillia over time to see if there was a difference after project FACTS started. It would be possible to check that any differences in Orillia were not due to general changes across the province.

The results of this analysis have as yet not been published. The only reference to the effect of the training on the whole of industry in Orillia was made by Brigadier-General C.J. Lauran (1971) who said:

> *'It is far too early to expect any definitive results...It is encouraging, however, to find that for 1970, as against 1969, there was a drop of 21% in accident cases reported by firms in Orillia employing 10 or more personnel.'*

<u>*'The Dynamic Feature of Accident Prevention'*. The Canadian Explanation of the Results from FACTS I.</u>

The final report on FACTS I (*op cit*) and the published paper by the York University research team concerning FACTS I (Miller and Agnew, 1973) contained the following interpretation of the FACTS results.

The authors stated that they were somewhat surprised by the strength of the relation between first aid training and reduced risk of industrial accidents. They argued:

'It may be that to be strongly effective individual first aid training should be supplemented by additional safety factors which help constitute a climate of safety. In other words safety factors in a situation may reinforce each other.'

They argued that the industrial setting provided a stronger safety climate than the average home or highway setting. As a result of legislation and research, industrial settings had a variety of safety features and signals such as: machinery guarding, non-slip floors, warning signs and sounds, personal protection and safety monitoring. They argued that first aid training reinforced the influence of other safety factors and in turn was reinforced by them. Also, the greater the number of first aid trainees there were in a setting, the greater would be the effect of this 'dynamic' or safety reinforcing phenomena.

They argued that Bell Canada represented a company that was capitalising on such a safety dynamic by combining programmes aimed at reducing hazardous environments with widespread first aid training.

The authors continued:

'we were impressed by the apparent strong relation between first aid training and reduced industrial accident rates, and by the increased safety attitudes and information in evidence among the trainees.

Nevertheless, if we are to effect a major reduction in home and highway accidents, it may be that safety training will have to be supplemented by additional and obvious safety

(continued)

factors (relating to injury-inducing agents and environmental variables) in order to provide a dynamic reinforcing process that generates a safety climate such as we are perhaps approaching in some industries.'

They suggested that in the case of driving, first aid training would be more effective if accompanied by other factors such as first aid trained passengers, seat belt buzzers, and safety checks. In the home, while safety supporting factors were probably rare, they suggested that the effectiveness of the training would be improved by: other members of the family or neighbours being trained in first aid, television and radio safety messages, experience of accidents or near-accidents in the home and neighbourhood, and the presence of small children or the elderly - who stimulated safety awareness.

In conclusion they predicted that there would be a reduction following first aid training of 30% in probability of accidents for employees working in a setting in which a large number of safety procedures and signals were well established. In an average industrial setting, with less fully developed and supervised safety practices, first aid training might still result in a 20 - 30% reduction in the probability of accident per trainee, with company-wide risk of accident related to the ratio of trained to untrained staff.

They suggested that in order for significant changes in safety oriented human behaviour to occur, safety signals must reach a density threshold, where there were signals of sufficient strength and number to reinforce each other and hence strong enough to overcome established habits. If the strength and number of safety signals in a setting was below a given level, the probability of accidents for the first aid trained individual would approach that of the untrained.

No evidence is provided to support this suggested explanation of the effect of first aid training on accident involvement, and their insistence on the superiority of job environments seems to contradict the survey finding that off-the-job safety improved more than that of on-the-job safety.

Criticisms of the Orillia Project (FACTS I)

The following discussion is divided into two sections. The first is an appraisal of the criticisms of Powell (1973), and the second a general discussion of the problems of the Canadian research.

Powell's criticisms

Powell (1973) made four main criticisms of Miller and Agnew (1973):

(1) It was wrong to assume that accidents were the same as recorded accidents.

(2) Their results could have been obtained if first aiders were less inclined to report their accidents.

(3) There was little attempt to control for type of work and experience. First aiders might have been employed on different types of work.

(4) The accident rates of trained people were probably lower even before training.

(1) Accidents versus recorded accidents

Most of Powell's criticisms were based on the NIIP Report No. 21 (Powell et al, 1971). In this report it was shown that reported accidents often represented a very small proportion of those accidents which did occur. The levels of reporting varied according to such factors as; the presence of a surgery, encouragement to report, and how efficient and understood the reporting system was. Powell argued that for these reasons the Canadian data were invalid since the Canadian organistions were unlikely to be different from those British ones studied.

However, there are cultural differences between Britain and Canada. The major of these is the existence of the Workmen's Compensation Board. This organisation compensates accident victims promptly on a no-fault system. Therefore, there is greater incentive for Canadian workers to report accidents, especially those resulting in loss of time from work or the need for medical treatment. The data from Bell Canada were for lost-time accidents only, all of which would qualify for compensation. The Ontario Northland Railway data showed that first aid trained employees had significantly fewer accidents resulting in (a) a report only, (b) medical attention, and (c) loss of time from the job. This would suggest that reporting levels did not significantly affect the data.

The Canadian data were based on large industrial concerns with sophisticated data collection systems. In addition Bell Canada in particular was a firm that gave a lot of attention to safety. In these respects the Canadian organisations were very different from those British companies studied in the NIIP report.

Powell's first criticism therefore does not carry as much weight as he suggested. However, it wasvaluable in that it highlighted the need to consider the problem in further studies.

(2) Differential reporting

Powell again referred to the factors which influence the reporting of accidents and suggested that the status of being a first aider, and the ability to treat one's own injuries were likely to lead to under-reporting by first aiders. The NIIP report claimed that first aiders did not report their own accidents.

The main problem here is one of definition. In the NIIP report first aiders were those employees who were certificated and in charge of surgeries or first aid boxes and whose job involved being responsible for the treatment of injuries. The Canadian first aiders were mainly employees who had been trained in first aid (usually voluntarily) and who had no responsibilities for treatment, nor access to first aid supplies other than their own. It is misleading to equate these two groups.

A further criticism of Powell's argument is that although the first aiders in the NIIP study did not report their accidents, the non-first aiders did not report theirs either, i.e. there was no differential effect. Accidents were only reported where time was likely to be lost as a result of the injury. As stated above, the Canadian data was largely based on lost-time injury accidents and not minor injuries.

(3) Type of work and experience

Powell pointed out that work load, type of work, length of service and experience of the particular task were likely to affect accident frequency. He said that a first aider would be different from the rest of the workers in at least some of these respects and would not be subject to the same risks for the same time as the rest of the workers.

Again Powell was confusing the first aiders in the NIIP report with the first aid trained employees in FACTS I. The majority of the Canadian trainees were not the equivalent of certificated first aiders in this country. As such they would have no responsibility to attend to first aid emergencies or routine treatments, away from their work area (although they might well stop work to offer aid in an emergency which they witnessed). Indeed, Miller and Agnew suggested (*op cit*) that those trained in Ontario Northland Railways were those employed on the most dangerous jobs. Nevertheless, Powell's criticism is valid to an extent in that information is not available from Canada to determine how many of those trained in industry had first aid duties, and no attempt was made to match for risk exposure. This argument is developed in the following section.

(4) Lack of pre-training data base

Powell's fourth main criticism was that no baseline measures were made of accident rates before the employees were trained in first aid. He argued that there was therefore no evidence thattraining per se had any effect on accidents or on their distribution. This again is a valid criticism of the majority of the industrial data studied in FACTS I. However, the procedure used is a common one in accident prevention assessment and was necessary because of the form in which the data were available. The Workmen's Compensation Board data when available should overcome this problem. However, at present it is possible to argue that those trained in first aid could already have had a lower accident rate before training.

Powell summed up by saying that it was better to concentrate all medical services and treatment at a staffed surgery. This suggestion again shows his misunderstanding of the Canadian study. At no time was it suggested that treatment should not be carried out in a properly organised and equipped surgery, by properly qualified medical staff. The purpose of the Canadian training was, (a) to render adequate emergency first aid until more qualified help arrived, and (b) to reduce the accident rate of those trained.

Further Criticisms of FACTS I

(a) The Training

The research aim in FACTS I was to test the relationship between first aid training and accident rate. Two different courses were used lasting 8 and 16 hours. No description of the training used in Orillia was given by the researchers. However, it was shown above that the emergency 8 hour course contained specific safety training in which course takers were clearly told to be more safety conscious. Accidents and safety were stressed throughout the training. Consequently it was incorrect to claim that the project investigated the effect of *first aid training alone*.

The form of training used in the industries which supplied accident data was also not described. It is possible that the first aid training there was also combined with safety programmes, specifically designed to reduce the accident rate of those trained.

It was clear that in any proposed study designed to test the effect of first aid training two important controls had to be made. Firstly, the training had to be limited to 'pure' first aid, not contaminated with safety training. Secondly, the training course used had to be standardised as far as possible in order that as an experimental variable it might be accurately defined. This was particularly important when trying to explain any proven relation between training and accident rate.

(b) Propaganda

The first aid training in Orillia was combined with a massive publicity and propaganda campaign. People in the town were told to 'make Orillia the safest place in Canada' by learning first aid. Publicity also included statements about the effect of the training on safety and accident involvement. The whole town was caught up in the enthusiasm created by the campaign. It is possible that this propaganda created a 'Hawthorne effect'. No attempt was made to distinguish the effects of the training from those of the propaganda in the study.

This further contamination of the results would also have to be avoided in any proposed study.

(c) Sources of data

FACTS I was described as a community study. Despite this, the only accident data reported came from industries unconnected with the FACTS training. The survey data did come from Orillia, but it is incorrect to relate the findings from these two sources (as was done in much of the Canadian publicity material - see Appendix 2) as the training courses may well have differed considerably.

(d) The industrial accident data

Despite the criticisms levelled at Powell's attack on the FACTS research, a number of his criticisms of the industrial studies are valid, in addition to the points made above. In summary, the criticisms of these are studies are:

(1) No indication was given of the content of training or of how many first aiders were certificated or non-certificated.

(2) No baseline pre-training data were available from Bell Canada on Ontario Northland Railways to counter the criticism that trainees were already safer before training.

(3) Bell trainees were volunteers and so might have been more safety motivated for this reason also.

(4) No risk matching was reported for trained and untrained groups.

(5) The only 'before and after' study data available (from International Nickel) had no control group of untrained workers to control for the effect of changes in other relevant factors.

The proposed study had to overcome all of these criticisms.

(e) The role of the research team

The research team was not brought into the project until some time after training had started. As a consequence it was impossible for them to establish baseline measures of attitudes and safety relevant behaviour.

(f) The interview surveys

Despite the community aspect of the project, the interviews were carried out almost entirely with employed people (except for 5% of the sample who were housewives). Only people who were of employable age and who had been trained on the 8 hour course were interviewed in the trained groups. There was a token attempt to match the control subjects with the trained groups, by type of job. However, the matching was left to the firms who are likely to have selected those employees who could most easily be spared for interview.

The interviewers were hired locally and were not part of the research team. They received only one day's training and were paid by the number of completed interviews. The interviewers were also exposed to the massive propaganda campaign and were required to take the emergency first aid course shortly before they started interviewing. For all these reasons it would have been extremely difficult for these interviewers not to be influenced in their interpretation and recording of the answers given to them.

The interview schedule itself had shortcomings, which were due to the late introduction of the research team. For example, attempts to measure change in behaviour by post hoc questions alone as with the question:

> *'Do you consider yourself to be more capable of handling emergencies now, than before you took the course?'*

However, it also contained such elementary shortcomings as leading questions such as:

> *'Are you a more careful worker since taking a first aid course?'*

and

> *'Do you wear gloves when working with things that could injure your hands?'*

Interviewees were asked to anticipate the experiences of other people in questions such as:

> *'How likely is it that they will have to use their first aid training again?'*

This is a notoriously unreliable source of data (Oppenheim,1966).

It must be stressed that the interview data made little contribution to the conclusions drawn from FACTS I and the technique has not been used in subsequent Canadian projects. However, data derived from the schedule must be regarded as highly suspect.

(g) Exploratory model

The arguments proposed by Agnew and Miller leading to their conclusion that the effectiveness of first aid training was dependent on the climate of safety are far from clear and can at best be treated as hypothetical.

Conclusions from FACTS I

For all the reasons specified above FACTS I fell far short of an adequate investigation of the relationship between first aid training and safety in a community.

Despite the criticisms, the size of the postulated effect on accident rate appeared to be great enough to warrant further study. The most important problem in any further study appeared to be the establishment of the degree to which any changes in accident performance were the result of the first aid training and how much they were the result of any associated safety training or propaganda.

The Canadian Studies following FACTS I

The following sections describe the three Canadian projects which followed from FACTS I. The information included was not available until some time after the study described in this thesis was under way. No results have been published and the following discussion is drawn from publicity material and brief research reports. (Agnew and Miller, 1975; Campbell and Miller, 1975; Draayer, 1974, 1, 2; Lifeguard Volume 1, Number 1, 1975, and Project FACTS Bulletin, 1973).

FACTS II

At the conclusion of FACTS I the sponsors agreed that a further research project should be conducted, in industry only, to *confirm* the results of Orillia (Campbell and Miller, 1975). Despite the industrial setting the project had the title, First Aid Community Training for Safety II.

The area selected for the project was the cities of Cambridge and Guelph, Ontario. These cities were situated 15 miles apart and had populations of approximately 65,000 each. Both cities had a large variety of industrial plants of various sizes. FACTS II was conducted over a two-year period from January 1973 to December 1974 and concentrated on training workers through their place of work rather than on using the saturation technique used in FACTS I.

Research Method

The rationale of the research was to compare the accident records of employees who took first aid training (the trained or (T) group) with the accident records of a similar group of employees who did not take the first aid training (the untrained or (NT) group).

The initial T group consisted of every person trained through his place of employment between January 1st and July 31st 1973. The July termination date allowed a post-training period of at least one year. There were 384 people in Cambridge and 369 in Guelph in the initial T group.

Firms were sent a list of members of the trained group who were employed by them. The list gave the name, sex, age and, if known, the type of job and the time spent on that job of each trained person. The firms were asked to fill in the missing details.

For each employee in the trained group the firms were asked to select an untrained employee who:

(i) was of the same sex,
(ii) was employed on the same job,
(iii) had spent the same amount of time (plus or minus one year) on that job, and
(iv) was the same age (plus or minus five years).

They were told that these untrained employees should be *randomly* selected from those employees who fulfilled the four matching conditions. They were also asked to give details of the average numbers employed in the firm during the previous year.

Commitments from the firms to participate in the research were obtained by St. John Ambulance staff who also monitored the progress of data returns and followed up the initial request when required.

Because of the practical difficulties experienced by employers and the St. John Ambulance, not all of the T subjects could be matched with an appropriate NT subject. The final number of subjects was 298 T and 298 NT. Of these 596 subjects, 460 were male and 136 female.

The researchers claimed that this careful selection of matched subjects controlled for the effects of several extraneous variables and resulted in minimum data loss.

The data base used was the number of compensable accidents reported to the Workmen's Compensation Board for each T and NT subject pair for a period before and after the commencement of first aid training by the T subject.

The first aid training

The training was conducted in 286 first aid classes. 150 of these were conducted in Cambridge and 136 Guelph. A total of 3,604 people were trained using both the standard 16-hour course and the emergency 8-hour course. No indication was given of the number trained on each of these types of courses. Similarly, there was no information about the actual content of the training or how much safety training was included.

Publicity

Again little information is available about publicity techniques used in FACTS II. One publicity article (Project FACTS Bulletin, 1973) gave the following information:

> *'The concentrated first aid training in the Cambridge-Guelph area can bring about significant reductions in accident rates of participating firms. Under optimum conditions reductions of from 30 to 40% can be anticipated....The broader scope of the current program, with its aim of saturation training in business and industry as opposed to the general community approach taken in Orillia, will permit evaluation on a more controlled basis and should produce more conclusive results on which to base future programs.'*

Results from FACTS II

The researchers chose an analysis of variance to test the accident data because there were several variables to be simultaneously investigated. The first analysis examined the effects of location, sex and experimental condition on the number of accidents reported before training.

The results of this analysis indicated that none of the independent variables (location, sex and experimental condition) significantly affected the number of accidents reported in the pre-training time period.

The same analysis was performed on the post-training scores. There were two significant effects in this analysis, sex and experimental condition. Males had more accidents than females (49 to 5). This is surprising in view of the pre-training finding. NT subjects had more accidents than T subjects (36 to 18). The failure to find a significant interaction between experimental condition and sex indicated that both male and female trained subjects had fewer post-training accidents than did male and female untrained subjects.

The researchers stated that these results supported the hypothesis that first aid training was positively related to a reduction in accident rates and so supported the findings from Orillia.

The researchers pointed out some of the 'unavoidable' methodological problems of the study. Firstly, the selection of subjects for T and NT groups was not random. The process of selecting subjects for the T group was left to the employers. So it was possible that people already interested in safety were more inclined to volunteer to take the training, or that employees were selected for training because they were readily available. These problems were not necessarily too serious, assuming the NT subjects were adequately matched in terms of type of work done, since the differences in interest in safety should have been reflected in the pre-training comparison of injury involvement. This in fact showed no difference in accident rate.

Another possible problem was that there were relatively few accidents in the population under study because the final sample was smaller than anticipated. One reason for this was the failure of some companies to participate in the study by selecting appropriate NT subjects. The other reason for a smaller data base than anticipated was that minor accident data were not collected because these were stored in a different way than compensatable accident data. However, the researchers argued that the paucity of accidents was not a serious problem because the effect was very large.

In conclusion, the researchers stated that the results of FACTS II showed an association between reduced accident rates and first aid training. The consistency of this trend across companies in the FACTS I study, and across subjects in this study, indicated the operation of a non-random or systematic effect. The factors contributing to this systematic effect remained to be specified. They again put forward the theory that the association between first aid training and reduced accident rates was based on a combination of factors including; first aid training, trainee selection, plant safety procedures, and safety engineering.

While it was too early to specify the relative contribution of these variables, or their interaction effects, the researchers claimed that, in their various samples, first aid training alone had made a significant contribution to reduced accident rates. They claimed that it would be difficult to carry out investigations to determine the relative contributions of the factors because this would require remarkable co-operation from a variety of industries. However, in view of the consistency of the findings, and in view of the potential savings in financial and human terms, they recommended continuing studies of the relation between first aid training and accident rates.

Criticisms of FACTS II

Far less information is available on FACTS II than FACTS I. No information is available about the content of the training or the relative numbers trained on the 8 hour and 16 hour courses.

As with FACTS I, a large amount of publicity was used during the project, which was intended to *confirm* the findings from Orillia.

Attempts were made to control variables uncontrolled in FACTS I, and the methods used answered many of the criticisms levelled at that project. However, matching was left to the firms, and this and the comparatively samll number of matched pairs (384 out of 3,604 trainees, a sample of 10.7%) must cause some reservations about the results.

If it can be assumed as seems likely, that FACTS II training contained specific safety training this project also fails to differentiate between the relative effects of first aid training, safety training, and propaganda. However, the fact that the same trend was found in both FACTS I and II strengthens the conviction that accident rates were being reduced by one or more of these factors.

PROJECT LIFE

The third Canadian study - Project LIFE (Learn Industrial First Aid Effectively) commenced on January 1st 1975. It was designed to be a programme of safety oriented first aid training which would be conducted in the geographical area from East Hamilton to Mississauga in the North of Ontario - the area to increase as progress was made.

Very few details of this project are presently available, although a short unpublished (and anonymous) paper and certain publicity handouts provide some information (for example Lifeguard Volume 1, Number 1, 1975).

(a) Training

The project was directed at those firms in the area chosen that had experienced problems with high injury frequency rates. St. John Ambulance had been training personnel in the standard first aid course so that companies could meet the first aid requirements of the Workmen's Compensation Board. From this group, candidates were selected to be trained as first aid instructors. These instructors then conducted courses in emergency first aid for their fellow employees. The companies paid the costs of the training and classes were held in company time.

No written examination was included in the training but trainees were tested on their ability to perform the skills they had learned. The causes of accidents, particularly as they applied to the work site, were pointed out and emphasis was given to safe practices that avoided accidents. Those passing the course received a St. John Ambulance certificate, valid for three years.

More details of the training are given in the first issue of Lifeguard*
(*op cit*) which is included in Appendix 5. Under the title 'New Look in Training Methods Seen Giving Impetus to LIFE', Lifeguard reported:

> *'a dynamic new Multi-Media System package that provides industry with an extremely efficient method of furnishing Emergency first aid training to all employees.'*

It had been developed specifically for use in extending safety-oriented first aid training. It consisted of a colour and sound film of 90 minutes, work books, built-in practice sessions, course outline and Instructors' Guide. The areas of Emergency first aid on which the Multi-Media System concentrated were said to be those that,

> *'have shown to be the most effective in achieving a substantial reducation in injuries among those trained, with accompanying savings in manpower, production loss and money...The course's change in pace between films, work books and practical application makes for an interesting presentation, with students retaining required knowledge and skills much more readily than in a straight lecture atmosphere.'*

The film included scenes of casualty simulation in which injuries:

> *'are realistically portrayed, with an explanation of what caused them. These filmed scenes stress safety precautions to prevent such accidents and condition employees to deal with injuries in an effective manner if they occur.'*

*Lifeguard was Project LIFE'S own bulletin which acted both as an advertising and as an information giving publication.

No indication was given of why this new training package was developed or of what justification there was for the claims made of its effects. However, the following benefits were claimed to result from the training:

(1) Safer working conditions.

(2) Fewer accidents and personal injuries at work.

(3) More people trained to deal with any emergency.

(4) Skills aid family, friends and community.

(5) No cost to employees.

By the end of July 1975 a total of 27 instructors had been trained, 416 persons had been trained in standard first aid and 684 in emergency first aid.

(b) Publicity

An article about Project LIFE was included in Accident Prevention (1974) under the title 'Project FACTS comes to LIFE again'. The article included a synopsis of the findings from FACTS I and also the following:

> *'It was found that employees trained in first aid were more safety conscious. They not only had fewer accidents but those around them also had fewer.'*

This finding had not previously been reported and it was not made clear whether this was the result of the influence of the trained people or whether the improvement in accident rate had been caused by some factor other than first aid training.

Included in the first issue of Lifeguard (*op cit*) were both interviews and information about the project. The interviews with Mr. Michael Starr, Chairman of the Workmen's Compensation Board of Ontario and with Mr. Robert G. Loftus, Executive Vice-President of the Industrial Accident Prevention Association showed clearly that Project LIFE was no longer a research project but an accident reduction programme based on 'proven' results.

Results from Project LIFE

The initial results from Project LIFE were claimed to be encouraging. However, all the results have been of participation in, and enthusiasm for the programme. No accident or survey data have been reported.

FACTS ALBERTA

The fourth Canadian project started in September 1974 and was named FACTS Alberta. The objective of the study was to assess the effects of a FACTS programme on the industrial and general accident experience of the area during a period of about three years. The intention was to train a minimum of 25% and a maximum of 50% of the adult population in the St. John Ambulance emergency first aid course. Details of the project so far available are provided by two articles by Draayer (1974, 1, 2).

Area covered

The region selected for the project was the Grande Prairie - Peace River area. This region was selected for the following reasons:

(1) Its borders were clearly defined geographically.

(2) It had a well established industrial base.

(3) It had a stable workforce.

(4) Its community leaders showed a keen interest.

(5) The project could be handled locally with support from the Workmen's Compensation Board and St. John Ambulance, both of whom were already established there.

(6) Its need was greater than other areas considered. For example, it was reported in the Herald-Tribune (the area's only daily newspaper) that the number of car accidents in the Peace River Region in 1974 had increased by 35% compared with an overall increase of only 15% in the whole of Alberta. The people of the region were keenly aware that their accident rate had been well above the average for several years.

The region had more than double the population of Orillia and covered an area of 8,000 square miles, which was 400 times that of Orillia. It had one city, 9 towns and 14 villages, serving 60,000 people. About 8% of its population were native Indians with a very low level of education.

The first aid training

It was intended to train a minimum of 10,000 people at a rate of about 3,500 per year on the emergency first aid course.

The project started with 16 instructors trained in the use of the new multi-media course, presumably the course used in Project LIFE.

Publicity

All news media in the area, as well as direct mail, were used in the campaign to support the project, together with letterheads, envelopes and business cards and other promotion specialities such as bookmarks, buttons for trainees, plaques for firms with 100% trained, and church bulletins.

An advertising sheet on the project gave information in the form of questions and answers. Included on the sheet was this summary of the results of FACTS I:

> *'This new safety program will reduce the number of accidents - all accidents.*
>
> *Is there any proof that FACTS will get significant results?*
>
> *Yes! FACTS was first tried in the City of Orillia...The results were amazing! On-the-job accidents dropped by 30% (almost a third).*
>
> *Are you saying first aid training will prevent accidents?*
>
> *Yes! Many people believe that an accident or emergency must happen before first aid training is of any use. That isn't true! In Orillia it was proven that first aid training...helps to prevent accidents from happening in the first place!'*

The importance of publicity to Canadians is shown in this extract from the advertising sheet:

> *'What publicity will the FACTS program receive?*
>
> *The Workmen's Compensation Board of Alberta will see to it that all of Canada will be watching us to see how we do in the Peace*

River Region. If we perform well, other communities from coast to coast will follow. And a safer Canada will result.'

Accident data collection

The design of an adequate data retrieval index system and report forms for the collection of information was assigned to the Grande Prairie Regional College. However, in the second of Draayer's papers, it was reported that the statistical information needed to measure the success of the project was being collected by the Royal Canadian Mounted Police and the ten hospitals in the area.

No more information is available about the methods of accident data collection.

Early results

No accident data are presently available. As with Project LIFE the 'results' published have been of participation in and endorsement of the project.

Comments on Projects LIFE and FACTS Alberta

Few, if any, developments have occurred in these two projects. It appears that the new schemes are being used to reduce accident levels rather than to test any hypothesis (although it is claimed that accident data are being collected for FACTS Alberta). However, the information available from these two projects provides a further insight into the type of training and propaganda used in the Canadian research.

Details of the training used in Project LIFE are available. This package was a development of that used in FACTS I and II. The package was specifically designed to extend safety-oriented first aid training, concentrating on those areas which had been shown to be 'most effective in achieving a substantial reduction in injury among those trained'. No evidence is given about how the package was developed or validated. There is no evidence that independent researchers have looked at the training used in any of the four Canadian projects.

Evidence of the importance of propaganda in the Candian studies is confirmed by FACTS Alberta. Again people living in the area were told that they would be safer. The Orillia results were taken as proven and no mention was made of the researchers' caution.

Conclusions from the Canadian Projects

In the light of information available from the Canadian projects, it could be concluded that there was some support for the idea of benefits for safety from first aid training combined with propaganda and safety training. The first problem for further research was to distinguish between these three factors. To test the hypothesis that first aid training reduces injury accident rate to use a 'pure' first aid course uncontaminated by safety training or safety-specific propaganda. It was also essential that more stringent experimental controls should be employed to overcome the criticisms of the Canadian research. In particular, more attention had to be given to matching for risk exposure, and to the provision of an accurate baseline measure of pre-training injury accident involvement. In addition, the Canadian studies provided detailed points of guidance for the experimental design and data collection methods, which are taken up in subsequent chapters.

CHAPTER 3

A REDEFINITION OF THE PROBLEM

A REDEFINITION OF THE PROBLEM

As shown in the previous chapter the Canadians were able to show a correlation between their training and accident involvement. However, they failed to provide a reasonable explanation of the way in which first aid training could affect accident rate, and, as the researchers themselves admitted (Agnew and Miller 1972) a correlation alone between first aid training and accident rate is not sufficient proof of a causative relation (cf Harré; 1970). The purpose of this chapter is to develop a theory to explain how the first aid training might bring about a reduction in accident involvement. An accident model is developed and the manner in which first aid training may affect accidents is discussed.

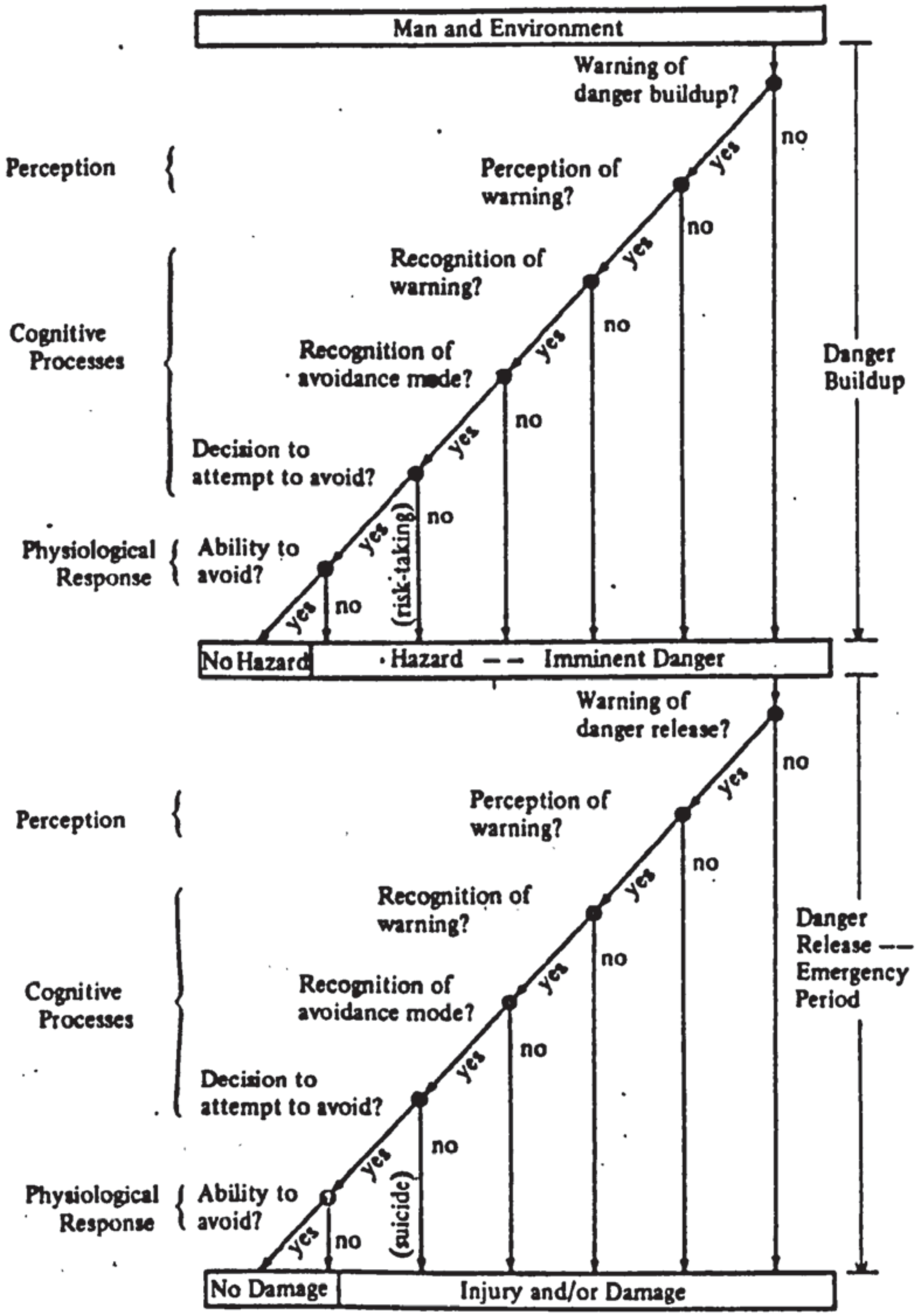
A PSYCHOLOGICAL ACCIDENT MODEL

Surry (1969) provided a model of the accident process in which she attempted to combine earlier models. The model (see Figure 1) developed has two similar cycles. The first deals with the development of a dangerous situation from a secure one, a process which may take time. The second covers the period - usually comparatively short - when the danger is released, leading to injury or damage. It is postulated that first aid training has its effect (if any) during the danger build up cycle and therefore this discussion concentrates on Surry's first cycle.

This cycle involves the total environment of man. This includes physical variables such as temperature, spatial layout, health and physical condition, and psycho-sociological variables such as behaviour and mood. By his action or non-action, danger to the person grows out of this environment. Three major processes are

FIGURE 1

SURRY'S ACCIDENT CAUSATION MODEL



outlined; perception, cognition and physiological response (behaviour). Surry argues that if a person does not perceive the potential danger, or does not know how to avoid it, or chooses not to avoid it (risk-taking) he is in a situation of imminent danger.

Hale and Pérusse (1977) described these processes in more detail. They argued that thinking about danger can lead to dissonance. This is uncomfortable and makes people inclined to suppress the whole subject and therefore not seek to spot dangers. Quoting Baddeley (1972), they argued that in tasks for which danger was a central element the danger would be likely to be perceived and acted upon, whereas when it was peripheral it would be ignored. They argued that it was such peripheral dangers which would therefore more often lead to accidents.

Hale and Pérusse also presented evidence that people did not believe a thing to be really dangerous unless they or their friends or work-mates had actually experienced it as dangerous. They also argued that, particularly with occupational health hazards, there can be a considerable time lag between the first occurrence of the danger and the appearance of the harm, during which time the victim has a great deal of opportunity to build up personal evidence that appears to show that there is no danger.

I hypothesised that first aid training would act at the stage of perception of danger. Firstly, the training might make people more alert to warning signals. This could be the result of increased motivation to avoid injury. Secondly, the training could give people a greater feeling that they could control or cope with danger and so reduce the dissonance produced by consciously contemplating and looking for danger. They might then more consciously consider their situation and relate previous relevant safety training and experience to it. Similarly, the training might make them utilise subsequent training and experience better. For example, a first aid trained worker might consider a cut finger to be more serious than an untrained colleague. He might then consider the circumstances leading to the injury to be more dangerous and hence take appropriate notice of any warning signals in future.

An important stage in the cognitive process is described by Hale and Pérusse (*op cit*). This is the process of dividing the responsibility to act against danger. They argued that the person might reject his own responsibility to act because he considers accidents unpreventable. Green and Brown (1976) found that one of the main dimension on which people judged dangers was whether or not they were controllable. It is possible to conceive of a continuum from accidents which are wholly unpreventable (or Acts of God) to accidents which are considered to be completely preventable.

Hale and Pérusse postulated a dichotomy between responsibility for technological and organisational precautions against accidents. In this dichotomy, the employer is responsible by and large for the technological, and the potential victim is responsible for many organisational precautions, including following rules and taking reasonable care. They argued further that thinking of their own safety was such a dissonance producing activity that workers were sometimes prepared to take any reassurance - however falsely based - that someone else was thinking about it for them. So, for accidents considered to be preventable a second dimension exists. This ranges from preventable wholly by self to preventable wholly by others, particularly, in the case of industrial accidents, by management. If a worker believes that he is responsible for accident prevention he is far more likely to adopt safe behaviour than if he thinks that accidents are uncontrollable or controllable only by others. First aid training makes people think about injury (a possible outcome of the result of danger). However, dissonance is reduced because the injury is immediately related to its treatment and so is portrayed in one sense as more controllable. I therefore hypothesised that first aid training, by reducing dissonance, would allow people to admit that injury and accident prevention were more within their control. Consequently they would rate their own responsibility for accident prevention higher and would be able to think more rationally about causes and prevention.

The second part of the cognition process was that of the recognition of safe behaviour and its availability. Awareness of danger in itself is not enough to avoid injury. The worker must also know the correct behaviour.and be able to take the necessary action. A worker may possess the necessary skills and training to adopt appropriate safe behaviour. However, he may not always automatically behave in the correct way. I hypothesised that first aid training made a worker consider possible dangers in advance and determine how he would behave when confronted by them. I argued that this would make the safe behaviour more readily available to him. A first aid trained worker might reconsider his previous training and experience or utilise future training and experience because he was more sensitised to the effects of injury. Alternatively, he might actively seek the appropriate correct behaviour from other sources, such as safety manuals.

Surry's next major process involved the adoption of safe (or appropriate) behaviour. If the worker is aware of the appropriate safe behaviour (that is, it is available to him) he then has the choice of whether or not to adopt the behaviour. If he decides not to adopt the safe behaviour he is taking a risk. The decision whether or not to choose the safe behaviour will be determined by a number of factors including his perception of the probability of injury and the negative value he places on this injury. It has been argued above, that first aid training might lead a trainee to consider injury and its consequences more often and to develop a greater willingness to avoid it. A further prediction might be that he would admit he was more likely to be injured and that his dissonance is thereby reduced. As a result of these changes it would be expected that the trainee would be less willing to take risks and more willing to adopt safe behaviour. Thus, this process is largely governed by motivation to be safe, that is to avoid injury.

Surry's final process, the physiological response, is outside the influence of first aid training. It is therefore omitted from this discussion.

The processes and hypotheses discussed above are summarised in Table 6.

TABLE 6

PROCESSES AND HYPOTHESES IN THE FACTORY STUDIES

PROCESS	FIRST AID TRAINING LEADS TO TRAINEES
PERCEPTION	
Awareness of danger/risk taking	Being more alert to warnings. Being better able to perceive warnings. Being better able to predict accidents to self and others. Rating other workers' behaviour more risky.
COGNITION	
Responsibility to act	Rating more accidents preventable. Rating their own responsibility for safety and accident prevention higher.
Recognition of safe behaviour/ Availability of safe behavour	Being more aware of appropriate safe behaviour in dangerous situations. Being more aware of how accidents could be avoided.
MOTIVATION	
Decision to adopt safe behaviour	Rating the likelihood of accidents and injury higher. Being more aware of the seriousness of injury and its consequences. Being less willing to take risks. Being more willing to adopt safe behaviour.

Questions in the interview schedules used in the present study were designed to collect information in all of these areas.

IMPLICATIONS OF THE MODEL OF THE ACCIDENT SITUATION

The preceding discussion defines ways in which first aid training may influence accident involvement. As stated in the introduction to this chapter, an important aspect of this research was to establish how first aid training influenced injury accident rate. This requirement necessitated an investigation of the tentative hypotheses outlined above. The methods available for measuring such influences, their problems, and the method selected for use in this project are discussed in Chapter 5 together with the method selected for measuring the effect of the training on injury accident rates.

PART II: METHODOLOGY

CHAPTER 4

RESEARCH DESIGN

RESEARCH DESIGN

INTRODUCTION

The present research study was devised in the light of the Canadian research findings available at the time (discussed in Chapter 2), and the model of the process of influence of first aid training on accident involvement (derived in Chapter 3).

DESIGN OF THE STUDY

The design of the study was a before and after measurement of injury accident data. I attempted to measure awareness of, and attitudes to: first aid, injury, safety and other relevant areas, in matched populations of trained and untrained workers. The design allowed four main tests to be made:

(a) Pre-training differences between volunteers for training and a matched control group of non-volunteers.

(b) Post-training differences between trainees and the matched control group of untrained employees.

(c) Changes in the interview responses and injury accident involvement of the trainees between pre- and post-training.

(d) Changes in the interview responses and injury accident involvement of the untrained control subjects between the pre-training period and the post-training period.

The choice of this design was essantial for two main reasons.

Firstly, one of the major criticisms of FACTS I was that pre-training data were not available. Consequently, it was not possible to reject the possibility that people trained in first aid were already more safety motivated and had less injury accidents, than untrained people. Secondly, it was important to have a baseline measure with which post-training interview responses and injury accident involvement could be compared. For example, if no difference were found in the post-training injury accident performance of the trained and untrained matched groups, it would not be possible to conclude that the performance of the trained group had not improved unless a baseline measure were available for comparison.

A matched pair design was also used for the analysis of interview data and injury accident involvement. Another criticism of FACTS I was that it was possible that the trained and untrained groups might not have been exposed to the same degree of risk. Trained subjects might have experienced fewer injury accidents because they were employed on 'safer' jobs. The matching used in these studies was designed to equate the degree of risk that the experimental and control groups were exposed to. A further advantage of the matched pair design was that it acted as a control for intervening variables beyond the control of the researcher which might have altered attitudes or injury accident experience. For example, both the experimental and control groups would be expected to be exposed to the same safety training, safety propaganda, improvement in plant and equipment, changes in shift patterns, and other influences upon safety awareness, attitudes, and performance.

Accident research has also shown that personal factors affect accident rates (for a review of this research see Hale and Hale, 1972). For this reason it was necessary to select matched control groups which took account of these personal factors. The factors which were taken into account when selecting the control groups are discussed below.

(a) Type of Job

The most important matching factor was type of job done, as this is the major determinant of the amount of risk subjects were exposed to (Powell et al., 1971). Wherever possible, matches were selected who were employed on identical jobs. Occasionally it was necessary to match workers together who perforn slightly different jobs which involved similar risk-exposure. For example, at one factory a few electricians were matched with workers who performed maintenance on instruments. In one factory, production workers within plants operated a system of job rotation so that, in time all workers did all jobs. In this case matches could be made with any worker in the same plant

(b) Age

Research findings (e.g. Sutherland et al, 1950., Van Zelst, 1954) generally agree that during their teens and early twenties the number of accidents to individuals is high. The accident rate then drops sharply levelling out in the mid twenties. After this there is a slight decline until the middle or late forties when the number of accidents starts to rise again until the end of the working life. Younger workers usually have less work experience and this factor can cause confusion with the age effects. However, Van Zelst (*op cit)* and Hakkinen (1958) matched experience and found that younger workers still had more accidents.

In the factory studies therefore, control subjects were selected who were as close in age as possible to the volunteers for training. For volunteers between the age of twenty-five and forty-five a maximum of five years difference was allowed. For all volunteers below twenty-five and over forty-five years of age it was possible to select a match who was within one year of the volunteer's age.

(c) Experience

What a person has learned and can remember about work hazards affect whether he succumbs to risks and has accidents. Most studies indicate that there is an initial learning effect of some sort after which the accident rate evens out.

Powell et al (1971) investigated both length of service and task experience. They found that the task experience of their accident victims was significantly less than that of non-accident controls who were matched on the criterion of job similarity. They also found that people repeating tasks which they had done in the recent past had fewer accidents on such tasks than on tasks which they had not done for some time. They concluded that task specific experience was a more important factor than length of service.

In the factory studies, matches were selected who had been employed on the same type of work for about the same length of time as the volunteers for first aid training. Again, a maximum of five years difference was allowed except where the volunteer had been employed on his present job for less than two years when a match was selected whose task specific experience was within six months of that of the volunteer.

(d) <u>Nationality</u>

Lee and Wrench (1977) made a study of accident rates in industry with special reference to immigrant workers. Five case studies were undertaken in firms in the Birmingham area. Data from surgery and personnel records yielded over four thousand accidents in the five firms during a period of a year. Analysis of the data provided little evidence that cultural background was a strong factor related to industrial accident rates. They did find that male immigrant workers consistently filled the more dangerous jobs. The researchers suggested that it was this factor which explained the idea of 'accident-prone immigrants'.

It would appear from this evidence that matching for type of job done, age and task - specific experience would be sufficient to overcome apparent differences in the accident rates of different races. However, matching for race was thought to be important for the interviews, since it was likely that different ethnic groups would hold widely different views of accident causation and perhaps of other factors. Analysis of the interview data in the present study showed that West Indian respondents did appear less willing to talk about possible injury, its likelihood and its consequences, than indigenous workers.

Matching for nationality was a straightforward exercise as individual record cards indicated country of origin.

(e) Sex

Some research (eg. Vernon, 1926, 1945; Cohen et al, 1955), shows that there is a difference between men and women in accident liability when faced with the same risk. Therefore, matches were made on this criterion also.

(f) Other Factors

Other individual factors have been shown to have an effect on accident rate (see Hale and Hale, 1972) for a comprehensive review) but the effects are usually minor compared to the factors discussed above. The availability of matches for the control groups was also limited so much by the factors already considered that no more criteria could be controlled for.

Selecting subjects for interview and injury accident data analysis

When the final list of volunteers for first aid training had been received, an attempt was made to match each volunteer with a worker who had not volunteered for training. Each match had to satisfy the criteria discussed above. It was not possible to provide a match for every volunteer. Data for unmatched volunteers were not collected although they all received training.

The complete list of matched pairs was used for the injury accident data analysis, excluding those pairs of employees who had not been employed for the whole of the pre-training and post-training period over which accident data was collected. A smaller number of matched pairs were selected for interview. The number of pairs interviewed at each factory was limited by management's desire to avoid disruption of production. Pairs for interview who were the best matches in terms of age and task-specific experience, and who represented the different areas in the works were chosen.

As far as possible the same respondents were interviewed both pre- and post-training. However, if either the volunteer or his match was unavailable for the post-training interview, both were excluded. Wherever possible, another matched pair was interviewed post-training in an attempt to maintain the size of the experimental and control groups. Reasons for unavailability for interview post-training included: absence through illness, redundancy, voluntary resignation, and failure of a volunteer to complete his training.

Field Research versus Laboratory Research

The above description of the overall research design presents an idealised picture of field research in general and this project in particular. The project was carried out in industry, not in a laboratory and was subject to all the associated difficulties.

In the laboratory, the researcher has a great deal of control over experimental design and is able to reduce or completely eradicate variables which may produce experimental error. Sophisticated subjects - experienced in experimental research - who are easily able to understand their role in the experiment, are often used. In the factory, a researcher is dealing with workers who are not used to answering questions or completing attitude scales. In the present study I was not in a position to control other factors which might affect injury accident rates such as on-going safety training, safety propaganda and other changes in the factory environment. I had to accept existing systems for collecting injury accident data with all their inadequacies for research purposes and had little control over the distribution of important information and the display of the first aid propaganda. Another problem was the relatively high rate of staff turnover and the absence or unavailability of respondents through injury, illness, or pressure of work. Other uncontrollable factors which caused delay were industrial action and the fuel crisis of winter 1973/4 which led to a three-day working week.

Other factors resulted in the need to alter the nature of the research as the project developed. Further information about the Canadian research and its shortcomings became available at the end of the first factory study. Prior to this it had been intended that the first factory study would be the only one prior to research starting in the community. The lack of positive results together with the new information about the safety content of the training in Canada necessitated two further studies to explore the implications for the community study.

Each training exercise revealed inadequacies in the first aid training. In a controlled study this should have been left unchanged, but this course of action was impractical and improper in a piece of action research. Therefore, improvements to the training course were made in the light of problems experienced. Efforts were also made to improve the training given to the first aid instructors.

Further constraints were imposed by the fact that the three factory studies were designed to be pilot studies of research techniques to be used in a community study. This meant that the interview schedules were changed after the first factory, making true comparisons between findings impossible.

A study of this nature required participating factories to provide clerical assistance, lose production, and spend money (if only indirectly). For these reasons a great deal of time was spent canvassing support for the research and gaining entry to the three factories. For the same reason the three factories could not be matched in terms of type of work carried out, the nature of the population and the type of risks or safety training undertaken there. This problem made comparison of findings from the three factories more difficult.

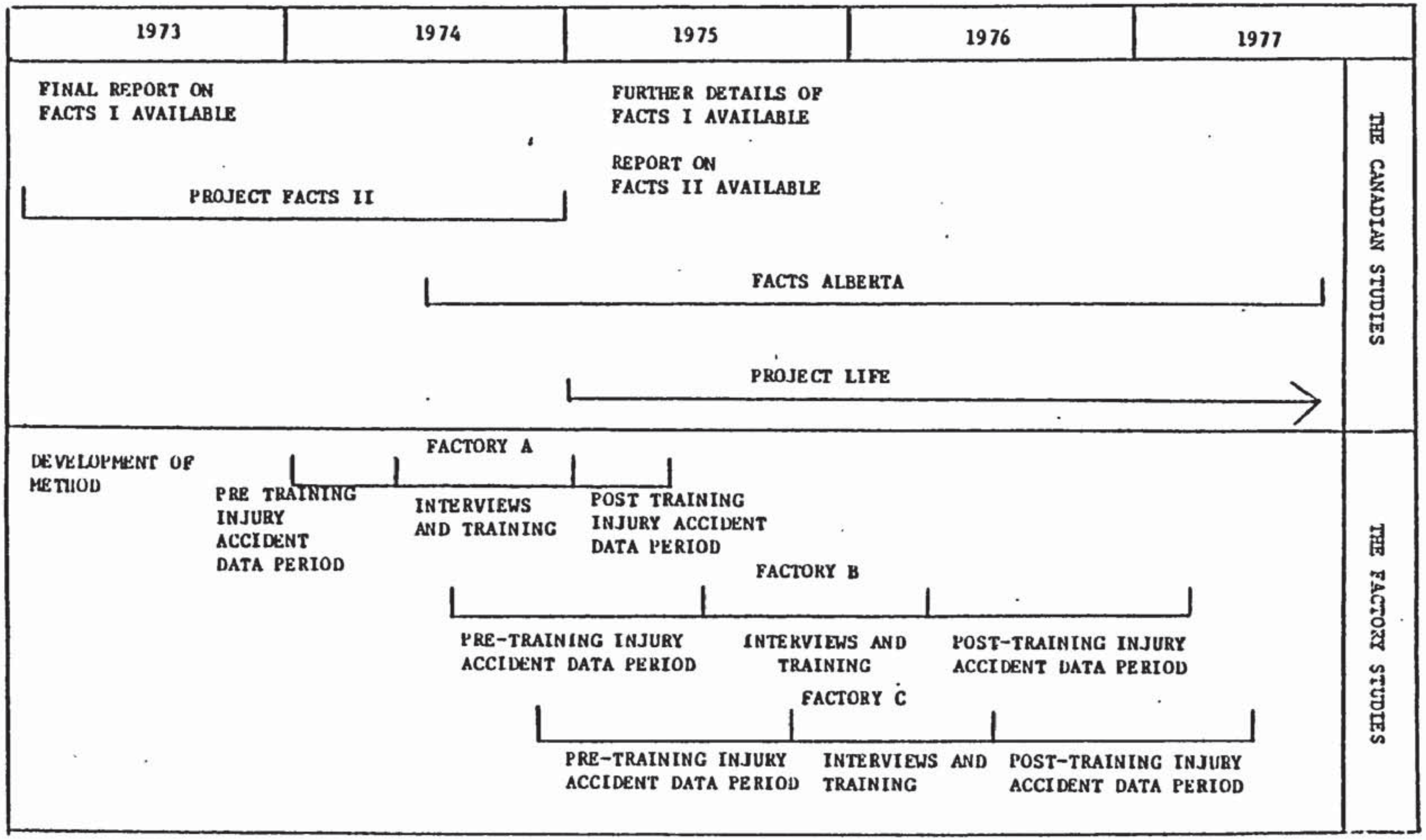
Despite these problems, it is reasonable to argue that research carried out in the field (in this case action research) is more valid than traditional laboratory research. The experiment was not carried out in an artificial situation and minimum disruption was caused to the normal working pattern of the subjects. Carrying out interviews in the factory helped to establish the relevance of the questions to the respondents' work place.

In conclusion, undertaking the present research project in industry produced delays and made careful control of extraneous variables difficult. However, the results from such a study produced a more valid test of the research hypothesis. Furthermore, should similar results be obtained from three different factories it would make it possible to argue that such results are not specific to one particular factory. Because the research evolved over a three-year period, it is sometimes difficult to describe clearly and concisely the development of the theoretical argument. Information affecting the design of the methodology only became available after an initial study had produced some results. Insights into the underlying theory, which cast doubts on some of the interview questions used, and which suggested areas which should have been included and were not, were only obtained from discussion of the final results. Research is an interactive process, and a thesis, which is a straight line narrative, can only represent a crystallisation of that process. This project was a piece of action research designed to produce change as well as to test a hypothesis in a controlled way.

To help the reader visualise the development of the research, its main elements are set out on a time base in Figure 2. A fuller description of the developments is contained in Appendix 6.

FIGURE 2

CHRONOLOGICAL SUMMARY OF THE PROJECT



The next chapter discusses the measures which were used within the overall design described in this chapter to test the hypothesis set out in earlier chapters.

CHAPTER 5

THE RELATIONSHIP BETWEEN FIRST AID TRAINING AND ACCIDENT RATE

THE RELATIONSHIP BETWEEN FIRST AID TRAINING AND ACCIDENT RATE

INTRODUCTION

Two problems of measurement arose in this project. The first problem was to measure the direct effect of first aid training on safety. The second problem was the measurement of changes in attitude and awareness resulting from the training. This second form of measurement was essential in order to test the hypothesised causal chain set out in Chapter 3. Both problems required the selection of the most appropriate research tools available. The purpose of this chapter is to discuss the available methods of measurement, the research tools selected for use, the reasons for these selections, and the limitations and problems involved in their use.

MEASURING THE DIRECT EFFECTS OF FIRST AID TRAINING ON SAFETY

Two main methods were available for measuring the direct effects of the first aid training on safety:

(1) injury accident records, and

(2) observation of behaviour, for example safety audits and use of personal protection.

The second method, observation of behaviour, was not selected for use because the resources and time necessary for detailed systematic observation were not available.

The most direct and objective measure of the effects of first aid training on safety would be injury accident data. These are relatively easy to collect and do not involve subjective interpretation by the researcher.

The problems of interpreting injury accident data are well known in safety research (see for example Powell et al.,1971) and it is not proposed to discuss them in great detail here. Firstly, not all injuries are reported for a number of reasons including self-treatment, poor data collection systems, and judgement by the injured person as to whether the injury requires treatment. Secondly, it cannot be be assumed that the level of under-reporting will remain constant over time. The level of reporting may fluctuate, particularly when interest is shown by researchers in safety performance. One criticism of the Canadian research was that the level of reporting of the trained and untrained groups may have differed, resulting in an apparent difference in accident involvement.

One method of overcoming the problem of under-reporting is to collect details of the more serious injuries only, those which are almost certain to be reported, usually leading to loss of time from work. However, lost-time itself is not an adequate measure of seriousness of injury. There is a variation in individual likelihood to lose time from work following injury (Senneck, 1973). This likelihood depends on a number of factors including type of work done, social custom, and the willingness of doctors to provide a certificate stating that the patient is unfit for work. A further shortcoming in restricting accident data collection to lost-time accidents is that such accidents are relatively rare.

In FACTS II the Canadians restricted their data collection to compensatable injuries and found that very few occurred even over a large population. In the present study the size of the population under study and the time period over which data could be collected would not have provided sufficient lost-time accidents for a meaningful statistical analysis. For this reason the measure used was taken as all first attendances at the factory surgery following an injury accident.

However, two main problems remained. Firstly, under-reporting as outlined above. To allow for this, questions were included in the interview schedules in an attempt to ascertain how much under-reporting occurred.

The second problem related to the statistical distribution of reported injuries. Even using the measure of all first attendances at the surgery following injury, for the time scale available for data collection in this study, the majority of employees had only had one or no accidents. Thus, the distribution of reported injury accidents was highly skewed. This not only made statistical analysis more difficult but also made it more difficult to show a significant change in injury accident involvement.

Data from records can be backed up by asking respondents questions about their accident involvement and their behaviour relevant to safety, including the use of personal protection, etc. This method is relatively easy to carry out and is economical in the use of the researcher's time. However, there are many problems in using interviews for this purpose, the main one being the introduction of bias through 'socially acceptable' responses. These problems are similar to those encountered in trying to measure the hypotheses in the causal chain, and are therefore discussed in the next section. Some questions were included in the interviews, despite these problems.

MEASURING CHANGES IN ATTITUDES AND AWARENESS

The aim of the project was to measure the effect of first aid training on accident involvement. For accident rates to fall, behaviour must alter. However, as explained in the previous section, the observation of behaviour relevant to safety was beyond the resources of this research project. A way round this restriction was to test the chain of hypotheses outlined in Chapter 3 since, if changes could be shown here, it would strengthen the argument that behaviour had changed. These hypotheses related to awareness, attitudes and behaviour. Hence, it was necessary to develop a research technique capable of measuring changes in these three areas as accurately as possible. The following sections briefly discuss the relation between attitudes and actions, outline the methods available for measuring awareness, attitudes and (indirectly) behaviour. It is also explained why interviews were selected, and the problems involved in developing an interview schedule are discussed.

ATTITUDES VERSUS ACTIONS

The relationship between attitudes and actions is an area of social psychology which has been extensively researched. It is not proposed to give a detailed review of the evidence here (see Deutscher (1973) for such a review) but merely to discuss the extent to which attitudes in general might be expected to predict behaviour.

LaPiere (1934) found that what people said about a despised minority was inversely related to what they did when confronted by that minority. LaPiere concluded that it was more important to look at a person's behaviour than his questionnaire response. Warriner (1958) found in a small rural community in Kansas that there was a systematic inconsistency between people's publicly expressed attitudes against drinking alcohol and his observation of their drinking, which took place privately, behind locked doors. It is possible to argue that Warriner did not elicit the personal attitude towards alcohol but simply got people to express the 'official line', a danger which could well occur when asking respondents about risk-taking, reporting accidents, and the use of personal protection, etc. Results such as these seem to suggest that attitudes cannot be used to predict behaviour. However, this would be too dismissive.

Campbell (1964) criticised LaPiere's interpretation of his results in terms of the difficulty of expressing prejudice. He argued that it was far more difficult to refuse a well-dressed Chinese couple travelling with a European in a face to face setting than it was to refuse the Chinese as a race in a mailed questionnaire. Ehrlich (1969) argued that attitudes comprised several components and that a single attitude object might implicate many attitudes. Predictions of behaviour that did not take account of at least a majority of these attitudes would probably be wrong.

Perhaps the most helpful approach to the problem of the relation between attitudes and actions was taken by Regan and Fazio (1977), who argued that the method by which an attitude was formed was a crucial variable, affecting attitude-behaviour consistency. In reviewing the evidence for and against attitude-behaviour consistency they referred to the work of Kelman (1974), who pointed out that there was empirical evidence that demonstrated a strong relationship between attitudes and behaviour. For example, high consistency had been documented between political attitudes and political participation of various sorts, and between attitudes to racial and national groups and association with members of those groups. They also quoted Goodmonson and Glaudin (1971) who obtained a correlation of 0.58 between attitudes toward organ transplants and willingness to commit oneself to donating a bodily organ after death. Regan and Fazio concluded that the important question was not whether, but when an individual's attitudes could be used to predict his overt behaviour. They conducted field and laboratory experiments to test the notion that attitudes which had been formed and which developed through direct personal interaction with the attitude object were more likely to influence, and therefore be better predictors of, subsequent behaviour toward the attitude object than those formed in other ways.

Their field experiment looked at the attitudes and behaviour of students directly and indirectly affected by a housing crisis at Cornell in 1973. Their laboratory study looked at behaviour and attitudes to puzzle solving in groups with direct and indirect experience of the puzzles.

The results confirmed that subjects who had formed their attitude on the basis of direct behavioural interaction with the attitude object showed significantly greater attitude-behaviour consistency than did subjects whose attitude was formed indirectly. The authors concluded from the two studies that for a person who has had direct prior experience with the attitude object, an attitude results which is more clearly and confidently held. Such an attitude was likely to be more closely tied to an individual's self image, than one formed through less direct means, and consequently was likely to be more accurately predictive of subsequent behaviour.

The authors suggested that when attempting to predict subsequent behaviour from an attitudinal measure, it would be helpful to know whether the individual has based his attitude on direct personal experience with the attitude object. This finding has great importance for the present research. The majority of areas investigated, for example, accident experience, awareness of danger, risk-taking behaviour and so on had been directly experienced by the respondents. If Regan and Fazio were correct in their conclusions, attitudes expressed on these areas should have been reasonably consistent with respondents' behaviour. It would appear that Regan and Fazio's results allow some confidence to be placed in the findings from the interviews in the present study.

Deutscher (1973) in his comprehensive review of the evidence for and against consistency between attitudes and actions suggested that much of the discrepancy can be explained by methodological difficulties and still more by 'conceptual difficulties'. However, he also allowed that:

> *'it can be empirically demonstrated that men do not act as they say they do'.*

He suggested therefore that attitude information should not simply be rejected as rubbish but it should be 'discounted' and interpreted, that is, it should be used but not necessarily with as much confidence or even in the same manner as the original author used it.

The concept of discounting is important to the present study. The objective measure of the effect of first aid training was the injury accident data. The interview data was included in an attempt to explain and add weight to the accident data. The information from the interviews alone could not be proof of the relation.

Some idea of the degree of discounting necessary in using attitude measures in the field of safety can be obtained by looking at the small amount of evidence available on the consistency between attitudes and actions in safety research.

The study of attitudes to safety and accidents is a comparatively modern development in the history of accident research. Three studies commissioned by the European Coal and Steel Community looked at attitude to risk and its relationship to safety. In each case the measure of behaviour was indirect, whether or not the subjects were accident repeaters.

Robaye et al. (1963) showed their subjects a series of photographs and asked them to estimate the risks involved in the work situations depicted. They also asked them to estimate how often the situations occurred and the frequency of a number of different possible outcomes. They found that subjects with a high accident record judged the risks in the situation to be greater, and considered that they themselves had experienced the situations more often than subjects with a low accident record. However, the accident repeaters also underestimated the frequency and severity of injuries which could result from the situations.

Spaltro (1967) carried out a similar exercise using a questionnaire. He also found that accident repeaters estimated the risks in the situation to be higher than the accident free group.

Molitor and Mosinger (1967) produced a questionnaire that measured anxiety produced by items to do with fire, ranging from sparks to atom bombs. They found that accident repeaters had low fear scores on the scale, while accident free workers had either high or very low ones.

The first two of these studies indicated some degree of consistency between attitudes to risk-taking and behaviour (measured by accident involvement). In both cases the accident repeaters rated the risk higher than those with a low accident record. Harper and Kalton (undated) also found that accident repeaters tended to regard their work as more dangerous than accident free workers. They suggested two possible explanations for this finding. The effect could be the result of a personality difference, accident repeaters being nervous, or it could be a post hoc rationalisation, the accident repeaters wishing to preserve their self respect. The first explanation is contradicted by the findings of Molitor and Mosinger who found that accident repeaters had low fear scores. However, rather than postulating post hoc rationalisation it appears more likely that accident repeaters, having experienced more accidents, would judge their work to be more dangerous than people who have not been injured. If this were the case, it would be clear evidence of consistency between attitudes and behaviour. This discussion is somewhat speculative since Harper and Kalton did not report evidence to discount the possibility that the jobs of the accident repeaters were actually more dangerous.

Evidence of inconsistency between attitudes and actions in safety has also come from the study of the use of protective clothing (for example Kuyer, 1967; Iacano, 1967). A general finding is that there is a difference between attitude and behaviour, since a large number of workers who expressed themselves in favour of protective clothing in fact did not wear it. However, many factors have been shown to affect willingness to wear protective clothing including cost, comfort, appearance and social pressure (Laner, 1959). However, Laner's study also showed that wearers of protective clothing were more convinced of its usefulness than non-wearers (providing some evidence of consistency) but were also more critical of its design.

Once again, in the field of safety attitudes, there is evidence for and against consistency between attitudes and actions.

METHODS OF COLLECTING DATA ON AWARENESS AND ATTITUDES

Despite the problem of whether or not attitudes are a reliable predictor of behaviour it has already been shown that it was necessary to collect data on awareness and attitudes in the present study.

Moser (1958) described the following four methods of collecting information from a group of people:

(a) Documentary sources,
(b) Observation,
(c) Questionnaires, and
(d) Interviewing.

The problems in the use of observation have been discussed above. Neither observation nor documentary sources could provide measures of awareness and attitudes, except indirectly and subjectively. When investigating opinions, awareness, or attitudes there is no reasonable alternative to asking questions, even when one is aware that the answers may be distorted or that the questions can be misunderstood or that memory can be faulty. Thus the methods available for collecting information on awareness and attitudes were limited to questionnaire and interview.

Questionnaires have been widely used in social research. Their use is becoming more common and they are frequently encountered in everyday life. The main advantages of questionnaires are as follows:

(i) They are cheaper and quicker than interviews.

(ii) They can cover widespread populations.

(iii) All questions are identically delivered and the answers written down exactly as given by the respondents.

(iv) It is possible that respondents may be more willing to answer personal or embarrassing questions when not face to face with the interviewer.

(v) No time is wasted with non-responders.

However, there are also a number of disadvantages is using questionnaires:

(i) There tends to be a low response rate.

(ii) The questions must be relatively simple and the questionnaire relatively short.

(iii) The answers are final, allowing no chance to check comprehension or ambiguous answers.

(iv) Questionnaires are inappropriate where spontaneous answers are required as is usually the case in attitude studies.

(v) It is possible for the respondent to read all the questions before answering, making it difficult to keep answers independent.

(vi) Observational data which may help the interviewer to interpret vague answers is lost.

INTERVIEWING

Interviewing is the most common method used in social surveys and usually the most appropriate. Interviewing is a common social act, parents interview children to find out where they have been and what they have done. Most applicants for jobs are interviewed and radio and television interviews are common. The data-gathering or research type of interview consists of three interacting variables; the respondent, the interviewer and the interview schedule.

The greatest advantage of an interview (by a skilled interviewer) is its flexibility. The interviewer can make sure the question is understood, probe further if necessary, show response scales and so on. Above all he can build up and maintain rapport, keeping the respondent interested and responsive to the end of the interview. The data from interviews tend to be richer and the answers are given spontaneously.

However, the interview situation is open to bias from intrusion of the interviewer's beliefs and opinions. These are discussed in detail below. Other disadvantages of interviews include their expense in terms of the interviewer's time, missed appointments, and the fact that the interviewer can become stale, particularly after frequent use of the same questions.

After considering the advantages and disadvantages of questionnaires and interviewing it was decided that the latter was the most appropriate method to use, for the following reasons:

(i) The experimental design involved matched pairs of respondents. The low response rate of questionnaires would have made this impossible. It was also possible to apply slight pressure to obtain the co-operation of interviewees who were 'not really interested'.

(ii) All interviewees were available in one place and it was possible to know when they were available. The respondents attended interviews during works time and many welcomed the opportunity of a rest and the chance to talk. If an interviewee refused to attend or was unavailable for some reason it was relatively easy to fill that appointment with another interviewee and to select a replacement, for interview at a later date. Time was thereby not wasted.

(iii) Certain of the questions on the schedule were complex and an interviewer was needed to direct answers in the required direction. It proved in fact that many of the respondents initially had difficulty in using the rating scales and the interviewer was able to explain their use and to avoid errors in completing them.

(iv) Spontaneous answers were preferred and during the interview respondents were not allowed to spend time considering their answers.

(v) At the beginning of the project the areas being investigated were largely unresearched and the interviews provided many insights into the subject matter. The researcher was able to discover problems of comprehension, wording and ambiguity.

INTERVIEW TECHNIQUES USED IN ATTITUDE STUDIES

Once the decision had been made to use interviews the next problem was to decide on the form that the interview should take. Various techniques have been developed for measuring attitudes. These range from straightforward questions of the type 'What do you think of...', through rating scales and checklists, to attitude scaling methods. The choice is dependent on the nature of the attitudes being measured, how well they are understood, the scope of the interview, and the sophistication of the respondents.

One requirement of the schedule in the present study was that it should investigate a wide field - attitudes to first aid, injury, danger, risk, etc. These were areas in which little previous research had been undertaken. Little was known of the attitudes involved in these areas and so the schedule was of necessity breaking new ground and attempting to find out which were the important concepts. As a result the initial schedule had to be composed of broad questions largely of an open-ended type. As the schedule developed, it was possible to make more closed questions and to provide more checklists and rating scales. A great deal more investigation is necessary into the relevant areas of safety before attitude-scaling techniques can be used.

Three other factors argued against the use of scaling techniques. Firstly, the variety of topics under investigation would require the development of many different scales. Secondly, no time was available to generate and validate such scales. The third, and possibly most important factor, was the low level of sophistication of the workers in the factories studied. One of the most important requirements for rapport between interviewer and interviewee is that the questions should be straightforward and meaningful to respondents. Even with the schedules used in the present study problems of comprehension occurred. Pilot studies showed that many respondents had problems dealing with response scales, for example ticking two or more points on a continuous scale. Particular problems occurred with the use of the word 'likely', many respondents being unable to understand the concept. Occasionally the interviewer gained the impression that points on response-scales were randomly marked. With such a low level of respondent sophistication it was unlikely that Thurstone, Likert or other forms of sophisticated scaling techniques would have been acceptable. Questions were therefore kept as simple and direct as possible, with limited use of scaling.

RESPONSE ERRORS IN INTERVIEWING

If it is assumed that for each individual there is one correct answer to each question, it is this answer which the researcher attempts to ascertain. Whether or not he achieves this depends on the nature of the question, the way it is asked, who asks it, and how much precaution has been taken to minimise the chance of error. The difference between the correct answer and the answer recorded is the individual response error.

Moser (1958) has listed the following sources of response error:

(a) Characteristics of interviewers,
(b) Opinions of interviewers,
(c) Interviewer expectations, and
(d) Errors arising from the respondents.

(a) Characteristics of the interviewer

Sex, age, education and social type can all influence the answers, either because of the impression made on the respondent, the way the questions are asked, or because respondents might give answers more willingly and differently to different types of interviewer. Inter-subject response error of this type may be reduced by using the same interviewer for all interviews, developing a good rapport with the respondent and using the same tone of voice each time a question is asked. Removing such response error completely is a difficult problem, depending on the skill and experience of the interviewer.

(b) Opinions of interviewer

If the interviewer's opinions are evident from the way the questions are asked then respondents will tend to bias their answers generally either to agree or disagree with the opinions, depending on their temperament.

This form of response error can be minimised by using the exact wording on the schedule at all times and by asking the questions in a uniform manner. As far as possible, answers should be written down verbatim and coding of these answers should not take place until all interviews are complete and the patterns of response from the respondents as a whole can be determined.

(c) Interviewer expectations

Interviewer expectation response errors can take three forms:

(i) Attitude-structure expectations, where the interviewer may gain an indication of the respondent's attitudes from his early answers.

(ii) Role expectations, where the interviewer gains an impression of the kind of person he is interviewing, and

(iii) Probability expectations, where an interviewer may expect a certain distribution of opinions or characteristics among his respondents.

All three of these forms can lead to the interviewer interpreting doubtful answers to fit his expectations. Recording answers verbatim will help to reduce this source of error, as will allowing respondents to mark their own response scales and checklists.

(d) Errors arising from the respondents

Respondents may give incorrect answers because they lack the necessary knowledge, their memory fails, they misunderstand the question, or because they do not wish to give the correct answer. A respondent may underestimate his frequency of having a minor injury in order to appear respectable to the interviewer. He may wish to agree with what he feels to be the interviewer's opinion in order to speed the interview or to gain the interviewer's approval. A number of methods may be used to reduce these forms of errors. 'Don't know' should be accepted as a valid answer to a question. A respondent should be put at ease, a good rapport established, and it should be made clear that there are no 'right' answers, that his ideas are important and valid, and that all answers will be treated with complete confidentiality. Where 'socially acceptable' answers are expected, questions can be written to counteract this effect. For example, a question asking about the reporting of minor injuries may be introduced in the following way, 'People don't go to the surgery for the treatment of every minor injury and illness they have at work...'. The interviewer should encourage all types of response (which are valid answers to the question) and never dispute or comment unfavourably upon any response made by an interviewee.

FURTHER METHODS AVAILABLE TO REDUCE RESPONSE ERRORS

The amount of probing necessary to produce an accurate response may vary from question to question. Probing which has proved effective in earlier schedules should be standardised and written into the new interview schedule.

Pilot interviews should be used to eliminate problems in the schedule. Vague or ambiguous questions should be corrected or omitted and wording should be improved. The length of the interview should be limited to about half an hour because both respondent and interviewer may become less attentive and less accurate. Important production workers will also become anxious about being absent from work for an unacceptable length of time.

The order of questions should be carefully arranged to avoid a response set developing. As well as ambiguous and vague words, leading questions, technical or uncommon terms should be kept to a minimum.

THE DETECTION OF RESPONSE ERRORS

As becomes clear from the above discussion there are many possible sources of response error. Methods have been suggested for reducing the size of these errors but it is not possible to avoid error completely. A question remains about the size of these errors and the extent to which they 'cancel out'.

Certain checks are possible. For example, the injury accident data were available to check with reported injury experience. However, as stated earlier, under-reporting may make the injury accident data inaccurate. Two forms of the same question could be asked but in the study of attitudes the way in which a question is phrased has an important bearing on the answer given. Re-interviewing may also be used but this is time-consuming, attitudes may change with time, and the respondents will have had time to think about the questions, resulting in the loss of spontaneity.

Since response bias is not totally removable the most important point is that the various possible sources of error should not be dismissed when the results of an attitude survey are being assessed. Results should be approached tentatively and appropriate 'discounting' allowed.

RELIABILITY AND VALIDITY

Attitudinal questions are sensitive to changes in wording, context, emphasis etc. As a result it is almost impossible to assess reliability by asking the same question in another form, as it will not be the same question. Consequently Oppenheim (1966) suggested that single questions should not be relied on when attempts are made to measure attitudes. He suggested that sets of questions give more consistent results because any bias will tend to cancel out. At the same time the underlying attitude will be common to all items. The present study was designed to look at a relatively large number of areas which had not previously been explored. For this reason large batteries of questions exploring one aspect in general could not be included in the schedule. However, where possible a number of questions were used to explore each area.

The present study could be said to have achieved construct validity if the predictions (based on the original hypothesis) were shown to be true. In such a situation the findings would support the theory and in so doing the schedule would be validated.

Oppenheim (*op cit*) described a different approach to validation of attitudinal questions which stresses the value of candor, depth and richness of information obtained. To follow this approach in estimating a respondent's attitude to danger it would be necessary to ask him free-answer questions and allow him to take his time and state his views in his own way, on the assumption that the more involved he became in his account and the deeper the level from which his answers came, the more genuine and valid his responses would be and the better they would predict his future reactions. However, in the present study time was not available for such 'in-depth' interviewing and many of the respondents would have found it difficult to verbalise their beliefs. Spontaneous responses were preferred as they are less open to defensive bias. Also, the main purpose of this study was not to measure the various concepts in depth but to explore areas which had previously not been studied in detail, as a means of explaining the link between first aid training and injury accident involvement.

Another possible form of validation is to compare findings with results from other studies. If such an external check were corroborative it would be justifiable to argue that the research was valid. The only possible comparisons were the surveys carried out at Orillia. As explained in Chapter 2, these were not of a high standard. They are therefore of limited use for comparison purposes and no other work has been carried out in this area. An internal comparison was possible between the results from the three factories studied in this project. The studies did differ insofar as the nature of the first aid training was different in each case, but more confidence could be placed in findings which were consistently in the same direction, particularly from the studies at Factories B and C.

In conclusion, the problem of validity remains one of the most difficult in social research and one to which an adequate solution is not available. The developed schedule would prove to be successful if it were able to distinguish differences in attitudes resulting from the first aid training. Any changes in attitude discovered had to be treated with great care and any conclusions tentatively arrived at. However, if such findings were consistent with each other and with the predictions from the original hypothesis, then more confidence could be placed in those findings.

CONCLUSIONS ABOUT MEASURING THE RELATION BETWEEN FIRST AID TRAINING AND ACCIDENT INVOLVEMENT

The problems of accurately measuring the effects of first aid training on accident involvement have been discussed in this chapter.

The objective information available was the injury accident data. However, it has been shown necessary to take steps to allow for and, if possible measure, the degree of under-reporting.

It has been argued that in order to investigate the mechanism underlying the relationship between first aid training and accident involvement, it was necessary to measure awareness and attitudes by means of interviews. Despite the somewhat contradictory results of research on the consistency between attitudes and behaviour, suitably discounted evidence was worth collecting.

The problems of collecting interview evidence have been discussed, together with ways of reducing response errors. Even when every effort has been made to avoid such error, it cannot be assumed that responses are entirely accurate. It has also been shown that testing the reliability and validity of a survey of this type is very difficult.

In conclusion, it is clear that the results from this study must be interpretated with great care and that they should be suitably discounted. Strong conclusions may be drawn where the various sources of information indicate consistent findings from different sources of evidence.

The next chapter discusses the detailed design of the interview schedule for the first factory in the light of the conclusions of this chapter.

CHAPTER 6

DEVELOPMENT OF THE INTERVIEW SCHEDULES

DEVELOPMENT OF THE INTERVIEW SCHEDULES

GENERAL CONSIDERATIONS

Three initial stages are necessary in the development of an interview schedule:

(a) Definition of the problem and areas to be investigated. This aspect was discussed in Chapter 3.

(b) Selection of appropriate questions.

(c) Pilot testing of the schedule.

SELECTION OF QUESTIONS AND PROBLEMS IN SCHEDULE DESIGN

This section briefly discusses factors which were taken into account when developing the interview schedule. This subject was discussed in more detail in the last chapter.

(i) Question Content. Questions were included about all the areas represented by the model in Chapter 3, that respondents were thought to possess the necessary knowledge or experience to answer. Care was taken with questions which might have produced 'socially acceptable' answers.

(ii) Question wording. Where possible questions were written in a way which involved personal experience. Technical words and jargon were avoided, and the simplest possible words used to convey the exact meaning.

In general, hypothetical questions were avoided. However, they were used to lead into a series of questions or where the experience of the respondents was limited, for example, 'Which parts of your body would you least like to injure?'

(iii) Context.

Care was taken in ordering the questions. As shown in Chapter 5 incorrect ordering can lead to response bias.

(iv) Open and Closed Questions. At the stage of the pre-training interview at Factory A, little was known of the areas being investigated and it was generally impossible to determine in advance the main response categories. For this reason the original interview schedule consisted mainly of open questions. After experience with the schedule during piloting and the interviews at Factory A, more questions became closed.

Three forms of pre-coded questions were used in the present study; check-lists, ranking, and rating.

(a) Checklists. These indicated to the respondent the alternatives from which he could choose and the type of response which was required. Ideally all items included in a checklist should be readily understood by the respondent. Where this was obviously not the case the wording was altered for subsequent schedules.

(b) Ranking. Ranking means arranging in order with regard to some common aspect. Oppenheim *(op cit)* suggested that under most survey conditions a limit of ten items can usually be put into rank-order. Two forms of ranking were used in the present study, but only at Factories B and C. Straightforward ranking of all items listed was used in the question which asked about the responsibilities of groups within the factory for accident prevention. A second form of ranking was used on the questions where respondents were asked to select from checklists the three worst types of injury and the three parts of the body they would least like to injure. They were then asked to rank their three choices. Such ranking gives the order or sequence but not the size of the rank-intervals, and these are unlikely to be equal.

(c) Ratings. These give a numerical value to some kind of judgement and can be applied to almost anything. In the present study graphic rating scales were used in which the response consisted of making a mark on a line running between two extremes or indicating a point on the line to the interviewer. Points on the scale were labelled in order to reduce the possibility of the respondents using different frames of reference. To reduce the danger of 'halo effects' scales were presented on separate cards or in booklet form where each scale was on a separate page. Respondents were not allowed to turn back to an earlier page to check how they had rated an earlier question. The end of the scale at which the 'socially desirable' response was situated was altered from question to question. The order of questions was arranged to separate responses which could be connected and therefore subject to 'halo effects'. For example, a respondent who rated the level of safety in his factory poor, might automatically rate his chances of injury high and also rate more accidents preventable. This form of response set was avoided by spacing out such questions.

The pilot studies were used to test the suitability of labels used on the rating scales. For example, respondents at Factory A were asked to rate how safe a driver they were. A scale which went from 'extremely safe' to 'extremely dangerous' would have been inappropriate as few drivers are likely to rate themselves as dangerous.

DEVELOPMENT OF THE PRE-TRAINING SCHEDULE

FOR FACTORY A

A pool of questions was developed covering the areas outlined in Chapter 3. These questions were checked and those which appeared to be ambiguous, leading, or unintelligible were eliminated. The remaining questions were formed into an interview schedule which was tested out at a food manufacturing factory in the West Midlands. The responses to the interviews were analysed and the subjective impressions of the interviewer were noted. Changes were made in the schedule to overcome the problems highlighted by the pilot study. The re-written interview was used for the pre-training interviews at Factory A and is shown in Appendix 7.

DEVELOPMENT OF THE POST-TRAINING SCHEDULE

FOR FACTORY A

The pre-training interviews at Factory A had two main purposes. They were used to investigate the areas outlined in Chapter 3 and also as a further pilot test of the interview schedule. The interview responses and observations of the interviewer were again used to eliminate or modify questions which proved ambiguous, unintelligible, or which appeared unable to discriminate between the experimental and control populations. Where possible, pre-training responses were used to construct checklists of the most frequent responses to open questions (for example, worst types of injury and worst parts of the body to injure).

The content of the post-training schedule differed from that of the pre-training schedule for other reasons. Questions asking about prior first aid training experience, reasons for volunteering, and history of first aid treatment, injury involvement and experience were inappropriate post-training. In their place questions were added to the post-training schedule to investigate trainees' reactions to the first aid training.

The post-training schedule is shown in Appendix 8.

Reasons for the differences between pre- and post-training schedules are summarised below:

(a) Ten complete questions were dropped from the pre-training schedule, two of these were not applicable post-training. Questions about the home were omitted as they were judged not to be relevant to the study. Certain questions on machinery guarding and personal protection were omitted because they were found not to be likely to discriminate; for example all respondents rated machinery guarding important. The question about safety consciousness was omitted because the term was not understood by a number of respondents.

(b) In three questions, parts which had been answered by few respondents, or which were thought unlikely to discriminate were dropped.

(c) Eight questions had their wording changed in order to make the question clearer or to obtain a particular dimension of response.

(d) The wording of four questions was altered to make them applicable post-training.

(e) Four questions were changed from open to closed as a result of the pre-training responses. The categories chosen were those which were most commonly selected by the respondents.

(f) Fifteen questions were added to the schedule which were only applicable post-training. The majority of these were relevant to trainees only and covered their reactions to the course they had taken. Although these questions were only applicable post-training, changes of wording allowed them to be used on a subsequent pre-training schedule to measure volunteers' expectations of the course.

(g) Two questions had parts added that were only applicable post-training.

(h) One question had a part added to investigate the area in more detail.

As a result of these changes only two questions in the pre- and post-training schedules were identical. Consequently, few pre- to post-training comparisons could be made on the interview data from Factory A.

OCCUPATIONAL HEALTH NURSES QUESTIONNAIRE

Two questions included in the interview schedules used at Factory A asked respondents to rate types and areas of injury for seriousness. Pre-training respondents were given a free choice. From these pre-training answers, checklists of the most frequently cited types and areas of injury were constructed for use post-training. It was hypothesised that, post-training, the trainees would have a clearer idea of the most serious types of injury and the most important or vulnerable areas of the body to injure. However, no objective scale of seriousness existed to compare with the responses of the two groups. In an attempt to create an objective measure of seriousness, a questionnaire was given to a group of occupational health nurses. They were asked to rate the seriousness of types and areas of injury. From the nurses' responses, weightings were calculated for each injury. By adding together the weightings of the first, second and third choice of each interviewee it was possible to give a score to each interviewee. A high score represented closer agreement with the views of the occupational health nurses.

Details of this experiment, and the weightings for each response are in Appendix 9.

CONCLUSIONS ON THE DEVELOPMENT OF THE INTERVIEW SCHEDULES FOR USE AT FACTORY A

One of the main purposes of the study at Factory A was to develop the research tools necessary to measure the effect of first aid training in future studies. As such, the interview schedules used at Factory A were being tested and refined for further use. Important and interesting information was collected on awareness and attitudes during the interviews, but it was not possible to accept the apparent trends uncritically.

It was possible to compare differences in response between the experimental and control groups on the pre-training interviews and on the post-training interviews. However, changes in response between pre- and post-training interviews could well have been explained by differences in the form of the questions on the two schedules. In conclusion, the findings from the interviews at Factory A did not adequately test the hypotheses set out in Chapter 3. However, they did allow the development of improved interview schedules for use in future studied.

CHAPTER 7

ATTRACTION AND SELECTION OF VOLUNTEERS FOR TRAINING

ATTRACTION AND SELECTION OF VOLUNTEERS FOR TRAINING

INTRODUCTION

In order to achieve sufficient numbers of volunteers for training at each of the factories it was necessary to use a certain amount of publicity. This chapter discusses the theoretical implications and general practical problems involved in advertising the first aid courses. For reasons of clarity and brevity developments of publicity at all three factory studies are discussed together.

In the three factory studies two separate forms of publicity were used. The first form of publicity was designed solely to produce volunteers for training and is described in this chapter. This publicity concentrated on the advantages of first aid training to the worker from a treatment point of view and did not mention safety or accident reduction. The second form of publicity was the first aid propaganda developed specifically for use at Factory C. This second form of publicity clearly linked first aid training with safety.

THE VOLUNTEERING EFFECT

One of the criticisms of the Canadian research (Chapter 2) was that volunteers for first aid training may already have been safer than people who did not volunteer for training. This argument assumes volunteer bias. It is reasonable to argue that people in the present studies who reacted to the publicity and volunteered for first aid training were in some way different from people who did not volunteer for training. To measure the effect of this volunteer bias it was essential that as accurate as possible pre-training measures were made of injury accident involvement, awareness and attitudes. In this way the effect of volunteer bias could be described. It was not possible to remove volunteer bias as it was not acceptable to participating firms to carry out compulsory first aid training.

EXPOSURE TO PUBLICITY

One problem with publicity was that it was not possible to guarantee that all employees would be exposed to the same amount of publicity. Certain workers were absent during part or all of the advertising campaign. Personal invitations were given to some employees, but not to all. A few respondents claimed at the time of the pre-training interviews that they were not aware that first aid training courses were available at the factory.

LEVEL OF PUBLICITY

The type and extent of the recruitment publicity used was governed by the firm and its existing methods of disseminating information. Thus inclusion of items in briefing notes could only be done where this system already operated (Factory A). Similarly, trade union officials could only be officially approached at the invitation of the firm.

The general level of publicity used was the result of the balance between the needs of the research and the wishes of the factories to have large numbers of employees trained. The researcher and St. John Ambulance aimed at training as many of the workforce as the experimental design would allow. It was necessary to have a large enough number of untrained employees to allow the selection of adequately matched control subjects. The firms costed the training exercise in terms of loss of production or overtime payments and thus found it necessary to restrict the number of trainees.

Generally, one or two forms of publicity were introduced followed by another form as and when it appeared necessary. Deadlines for recruitment were set and if sufficient numbers had not volunteered for training a new form of publicity was introduced and the deadline extended. An alternative method would have been to use as much publicity as possible immediately, and then to have turned away excess volunteers, probably on a first come - first served basis. It was thought that this method could cause industrial relations problems and might also have been unethical, should the research hypothesis be proved.

One unforeseen form of publicity caused occasional problems at each of the factories. This was the pre-training interview. Some control subjects expressed a desire to receive first aid training. They were eliminated from the analysis and were allowed to receive training if their employer consented.

FORMS OF PUBLICITY USED

Five main forms of publicity (a - e) were used in the three studies. A sixth (f) was held in reserve but not used in the event. These were:

(a) General briefs to management.

(b) Discussions with (i) supervision/foremen, and (ii) union representatives.

(c) Dissemination of information by briefing notes.

(d) Display of posters giving information and asking for volunteers.

(e) Personal invitation by supervisors, managers and union officials.

(f) Wage packet inserts advertising the training and asking for volunteers.

The forms of publicity used at each factory are shown in Table 7.

(a) General Briefs to Management

Verbal briefs were given by myself and St. John Ambulance personnel to senior Personnel Managers at all three factories. The nature and aim of the research project was explained. The form and extent of the firm's commitment were outlined and the possible advantages of the training to the individual workers and the firm were discussed.

This form of publicity was essential as each study would have been impossible without the co-operation of support of management. It was also necessary that they should be in a position to answer any queries about the project from the workforce.

The briefs to management included an explanation of the possible effects of the first aid training on safety. It was however stressed that no mention should be made of safety to the workforce as this would contaminate the study.

TABLE 7

FORMS OF PUBLICITY USED TO PUBLICISE THE FIRST AID TRAINING COURSES

FORM OF PUBLICITY	FACTORY		
	A	B	C
(a) Briefs to management	√	√	√
(b) Discussions with (i) supervision/ foremen	√	*	
(ii) union representatives	*	√	*
(c) Briefing notes	√		
(d) Advertising posters	**	√	√
(e) Personal invitation by supervision, management, union representatives and friends	√	√	√

*Informal discussions held

** A poster designed by the safety officer was used

(b) (i) Discussions with supervision/foremen

At all three factories management consulted supervisors and informed them of what would be happening. Where I was introduced to supervisory members of staff I explained the nature of the first aid training and the accepted, treatment benefits of widespread emergency first aid training. I also requested their co-operation in making workers available for interview. The reaction of supervision ranged from active support to total disinterest, with the majority offering their support.

(b)(ii) Discussions with union representatives

As in the case of the supervisors, management at the three factories consulted union representatives about the proposed first aid training. I was again introduced to the union representatives either formally or informally. I explained the nature of the training to be introduced and again stressed the treatment benefits of widespread emergency first aid training. The training programme was welcomed by union representatives at all three factories, and their influence was important in the recruitment of volunteers for training.

(c) Briefing Notes

Briefing notes were an extremely useful method of disseminating information. By adding short pieces to the regular briefs it was possible for all workers and staff to be introduced to the project and its progress. Only those workers absent on the day of the briefing missed the announcements. To overcome this a poster giving the information was prepared by the Safety and Training Officer and sited where general information was usually displayed. Unfortunately, the briefing note system was only used at Factory A. At later stages in the project these briefs were used to indicate the progress made and they helped to maintain interest throughout the project.

The briefs were written by the Personnel Manager in consultation with me. Any questions which arose out of the briefing sessions were referred back to me and this helped to avoid misunderstanding arising. The briefing notes used at Factory A are in Appendix 10.

(d) Posters

Posters were the main form of publicity used at Factories B and C. Two posters were prepared and used at Factory B. The first of these (Figure 3) was produced at short notice and used until the second poster (Figure 4) became available for use. The second poster only was used at Factory C.

The first poster was A4 size and had black lettering on a white background. It was designed to attract interest, give some information, and tell interested employees how to apply for the training.

The second poster was more attractive, eye-catching, and able to give more information about the first aid training. This poster was larger (42 cms x 59 cms) and had yellow lettering on a black background. Its three functions were to:

Aston University

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FIGURE 3 - FIRST ADVERTISING POSTER

FIGURE 4 - SECOND ADVERTISING POSTER

(i) attract interest and volunteers,

(ii) give details of the training, and

(iii) tell volunteers how and where to apply for the courses.

The posters were distributed throughout the works in prominent places, such as notice boards and places where the workers tended to gather. They were left on display until sufficient people had volunteered for training.

There were two main advantages in using posters as a form of publicity. Firstly, after design and printing they were very easy to display. Secondly, they were effective over a relatively long period and were seen daily by most employees.

(e)(i) Personal invitation

The extent to which this form of publicity occurred was governed by the success of the discussions held with management, supervision and union representatives. I was not in a position to determine how many people volunteered for training as a result of personal invitation, but this would depend on the influence of the people making the invitations.

When considering the influence of this form of publicity it is important to include the problem of volunteer bias discussed above. For example, the Safety Officers at Factories A and C considered that emergency first aid training would be particularly useful in the foundries, areas which had produced very few volunteers, and concentrated on encouraging people from these areas to volunteer for training.

(e)(ii) Encouragement from friends

A second form of personal invitation occurred. Some workers encouraged their friends to volunteer for training and occasionally put forward their friends names for training without consulting them. This process came to light during the pre-training interviews where on two occasions respondents reported that they were unaware that their name was on the list of volunteers.

(f) Wage packet inserts

The idea of using wage packet inserts appeared attractive as it provided a means of reaching all hourly-paid employees at an acceptable time. However, this form of publicity would have involved members of the wages departments in extra work and the idea was badly received at all three factories. Consequently this form of publicity was held in reserve in case it was needed, which it was not.

EFFECTIVENESS OF PUBLICITY

Questions were included in the pre-training interview schedules at Factories B and C to assess how interviewees had learnt about the courses, how influenced they had been by the publicity, and how well they could recall the advertising posters.

SUMMARY OF THE ADVERTISING OF THE FIRST AID COURSES

A variety of methods was used to provide an adequate number of volunteers for training. Questions were included in the interview schedules in an attempt to determine the relative effectiveness of the methods. It was noted that publicity was likely to increase volunteer bias but that the effect of the bias should become clear from the pre-training interviews and injury accident data analysis.

CHAPTER 8

THE FIRST AID TRAINING COURSE AND THE TRAINING OF INSTRUCTORS

THE FIRST AID TRAINING COURSE AND THE TRAINING OF INSTRUCTORS

This chapter describes the origin of the first aid training course used at Factory A and the briefing sessions designed to instruct the lecturers in its use.

THE 'DIGEST OF FIRST AID' (1970, 1975)

The first aid training course used at Factory A was based on the St. John Ambulance booklet 'Digest of First Aid' (1970). A four hour emergency first aid course had been developed in 1970 in conjunction with the Automobile Association based on this booklet. The course was designed to assist motorists but it did not prove successful as it was found that more than one training session was required to complete the course.

After omission of certain sections, particularly those dealing with first aid for motorists, to allow sufficient time for completion of the training, this course was used at Factory A. It was the only short course available at the time and there were three main advantages in using a short course. Firstly, it was decided that no charge should be made for the training and a four hour course - which did not require doctor's lectures - was less expensive than a 16 hour certificated first aid course. Secondly, a four hour course concentrating on the life saving techniques would be more attractive to potential volunteers than a longer course which included an examination. Thirdly, a short course would be more acceptable to industry as it would cause less interruption to production if carried out during working hours.

AIMS OF THE TRAINING AT FACTORY A

The main aim of the training at Factory A was to teach the basic life-saving techniques to an adequate standard. A selection of other serious injuries which were unlikely to lead to death were also included in the training, for example injuries to bones and joints.

An important consideration was to produce a standard training package. The course was designed to be taught in one of two ways at Factory A; as a complete four-hour course, or as four separate one hour sessions. The second method of delivery often involved the use of different instructors for each hour, and it was important that a new instructor could take over a class without notice and know exactly which topics had been covered in previous sessions.

Standardisation of training was also important for the research. In order to be able to explain any changes detected in pre- and post- training interviews it was important that the nature of the training should be the same for each trainee and that the content of the course should be included in research reports. As outlined in Chapter 2, two criticisms of FACTS I were that two separate courses were used (one of eight hours and the other of sixteen hours) and that no details of the training were included in the research reports.

One of the problems of achieving standardisation was that the instructors were volunteers from a charitable organisation (although they were paid for lecturing) and were not particularly amenable to attempts to change their teaching methods. This problem is discussed in more detail below.

THE FIRST AID TRAINING COURSE CONTENT AT FACTORY A

The areas covered in the training at Factory A were:

(a) the principles and practice of first aid,

(b) the structures and functions of the body,

(c) breathing and resuscitation,

(d) wounds and bleeding,

(e) shock,

(f) unconsciousness,

(g) injuries to bones and joints,

(h) burns and scalds, and

(i) other conditions (including common poisons).

TRAINING THE INSTRUCTORS USED AT FACTORY A

The training at Factory A was given by St. John Ambulance lay instructors from the county of Staffordshire.

A one day briefing meeting was held in Stafford and was attended by twenty-six qualified lay instructors. Prior to this meeting, the view was expressed by senior personnel from the St. John Ambulance Association, that it was impossible to order volunteer instructors to teach in a particular way. However, reasoned arguments should be used to assist in the achievement of standardisation of training. This approach was adopted for the meeting.

The briefing day was run by two senior instructors in the St. John Ambulance Association. The volunteer lay instructors were taken through the course and introduced to the content, techniques, and equipment to be used. They were questioned during the demonstration and there was a question session at the end of the meeting.

The aims of the research project were explained and details of Factory A were given,including the type of work done and the main hazards involved in that work. It was emphasised that 'pure' first aid should be taught and that no mention of safety in any form should be made. It was explained that this was not simply a training exercise but a research project for which standardisation of training was essential.

Finally, a supervising instructor was appointed to organise the training sessions and to liaise between the factory and the instructors.

It was realised at the time of the briefing session that the instructors had not received adequate preparation. However, it was thought that the instructors could not be expected to give up more of their free time. They were issued with a copy of the 'Digest of First Aid' and asked to spend as much of their time as possible familiarising themselves with the content of the course.

The study at Factory A was designed to be a pilot study for further exercises. As such, observation of the training sessions and comments made about them by instructors, trainees, and others involved with the training, were expected to indicate problems of course content and inadequacies in the training of the instructors.

THE MULTI-CHOICE QUESTIONNAIRE

It was assumed that for first aid training to have an effect on accident involvement, trainees must learn something during the training sessions. The first aid training course was designed to teach nothing other than first aid treatments and it was thought desirable that some measure should be made of the trainees' first aid knowledge, compared with that of the untrained group. As explained above no examination was included in the first aid training course. One question was included in the interview schedules to test first aid knowledge. This question asked which first aid treatments the respondents thought were the most important. However, this question was open to different interpretation by different respondents. Consequently, there was no objective measurement of the effect of the first aid training on the trainees' knowledge of first aid.

At the time of the study at Factory A St. John Ambulance were experimenting with a new form of examination for use on their certificated first aid courses and for testing lay instructors. The examination consisted of a battery of questions, each followed by four answers from which the candidate had to select the correct answer. A list of fifty multi-choice questions from the battery was available to me. These questions had not been validated. From these fifty questions fifteen were selected and made into a short test, in the form of a questionnaire, for the respondents on the post-training interview. Eight of these questions covered areas included in the first aid training course used at Factory A. Seven of the questions covered areas not included in the training at Factory A. It was recognised that this test would be a crude measure of the knowledge of the respondents. The questions used are in Appendix II.

At the end of each post-training interview respondents were asked whether they would mind filling in the questionnaire. They were assured that this was not an examination and that their individual score would not be given to anybody else. Trainees were told that the questions were not necessarily based on the training course they had attended. All respondents agreed to complete the questionnaire.

Each interviewee was allowed to work through the fifteen questions and to mark what he or she believed to be the most appropriate answer from the four alternatives to each question. The interviewer did not say anything or comment on the answers except to ensure that an answer was marked for each question and to explain the meaning the following terms if asked; recumbent, semi-recumbent, brachial, pressure bandage, and cold compresses. (None of these terms had been used in the first aid training). The time required to complete the questionnaire varied from five to fifteen minutes. On a few questions more than one of the alternatives was accepted as a correct answer.

The multi-choice questionnaire was only used at Factory A because St. John Ambulance personnel argued that it could be classed as an examination on the four hour course which was not designed to be examinable.

PART III: PILOT STUDY

CHAPTER 9

THE STUDY AT FACTORY A - INTRODUCTION

THE STUDY AT FACTORY A - INTRODUCTION

The FACTS I study in Canada had produced encouraging results relating first aid training to accident reduction (see Chapter 2). A decision was taken by St. John Ambulance in this country to examine the same hypothesis. They approached the Safety and Hygiene Group at the University of Aston in Birmingham and asked them to carry out research in a community, learning from the Canadian experience. Members of the Safety and Hygiene Group decided that a prerequisite of such a community project was the establishment and testing of research methods and hypotheses in a pilot study.

With the help of the local Engineering Employers' Federation representative contact was made with a number of local factories which had comparatively high accident rates. Of these, the most positive response was received from Factory A.

Following several meetings between myself, St. John Ambulance personnel and the Factory Manager, Personnel Manager and Safety Training Officer at Factory A, agreement was reached in the Autumn of 1973 to undertake the pilot study. A number of factors including the oil crisis and three-day week of early 1974 prevented the study from starting immediately and first aid training could not take place until the Summer of 1974.

DESCRIPTION OF FACTORY A

Factory A was a modern factory built on a new industrial estate in the West Midlands. It employed about 800 production workers most of whom were semi-skilled, although a certain number of laboratory staff and several maintenance engineers were employed. The factory produced non-ferrous metal extrusions for a variety of industries.

Materials, including large quantities of scrap metal, entered the factory in the metal handling department. Here the various metals were weighed, mixed and moved on to the furnaces which produced metal billets. These billets were cut to the correct length, reheated, and extruded through presses into rods, tubes or coils of various shapes, depending on the die used. The extruded rods and tubes were cut into shorter lengths and the finishing processes included straightening, removing sharp edges, and cutting the rods and tubes into small sections.

The main types of hazards resulted in burns, cuts, eye injuries and noise problems. The factory contained a clinic staffed by two male attendants who had gained nursing qualifications in the armed services. There was little evidence of prior interest in first aid training. A manager was employed who was responsible for both safety and training and had an engineering background. All new employees received induction training including safety instruction. Training for specific jobs such as overhead crane driving was also carried out. A selection of safety propaganda was displayed in the works. A safety committee met approximately once a month and departmental safety committees also had regular meetings. Approximately 60 injury accidents per month were reported to the surgery.

Permanent day and night shifts operated. There were two main bonus systems. Foundry workers received a bonus based on the number of billets produced. The majority of workers received a bonus based on the amount of finished material reaching the warehouse. Wages were generally high, but these were often achieved as result of industrial action. The majority of employees were British although a number of

West Indian and Irish workers were employed.

Of the three factories studied, Factory A was the most co-operative and interested in the research project. Their willingness to co-operate was demonstrated by their payment of overtime rates to employees receiving first aid training, and to important production workers for attending interviews outside their working hours. Secretarial help was made available to me and members of staff were very helpful in arranging first aid classes and interviews.

Chapters 10 and 11 describe the study at Factory A. The raw results are in Appendixes 12, 13 and 14.

CHAPTER 10

SPECIFIC METHODOLOGY AT FACTORY A

SPECIFIC METHODOLOGY AT FACTORY A

This chapter describes the specific methodology used at Factory A. The general design of the study was described in Chapter 4, the development of the interview schedules in Chapter 6, and the first aid training course used in Chapter 8.

ADVERTISING THE COURSES

The training was offered to all employees of the company. Every person who attended was paid at overtime rates and attendance was voluntary. The experiment was described to employees as a first aid training exercise. No mention of safety was made to employees (except senior management) at any stage of the project.

A number of methods were used to encourage volunteers to come forward for training. All employees were read briefs by their supervisors which stated that there would be a "project designed to investigate the effects of an awareness of First Aid". A notice was posted advertising the courses and calling for volunteers. A number of employees were also asked personally whether they would like to attend the courses.
A total of one hundred and sixty people volunteered for training of whom one hundred and thirty eight were eventually trained. The remaining twenty-two either changed their minds or were unable to attend. The number trained represented 18% of the work-force.

MATCHING VOLUNTEERS WITH NON-VOLUNTEERS

Each volunteer was matched with a non-volunteer using the criteria outlined in Chapter 4; type of job, age, task specific experience, nationality, and sex.

INTERVIEWEE SELECTION

Two groups of fifty employees were selected for interview. The groups consisted of the most closely matched pairs of volunteers and non-volunteers who represented all sections of the factory including the kitchens and staff. The group of fifty experimental subjects who were to be trained in first aid were called the volunteer group. The group of fifty matched control subjects who were not to receive first aid training were called the non-volunteer group.

THE PRE-TRAINING INTERVIEWS

Interviews were conducted prior to the first aid training. The pre-training interview schedule (Appendix 7) was designed to:-

(a) measure differences between volunteers and non-volunteers, including their history of first aid training, and

(b) to investigate the areas discussed in Chapter 3 - knowledge of first aid and first aid motivation and competence, awareness of danger/risk-taking, responsibility to act, awareness of safe behaviour, decision to adopt safe behaviour, and reported action relevant to safety.

A further aim of the pre-training interviews was to eliminate or modify questions which proved ambiguous, unintelligible, or which failed to measure differences between the two groups because of lack of sensitivity. It was also used to determine items to be used on future checklists and to check the rating scales used.

The success of the interviews was dependent upon the co-operation provided by the factory and the interest shown by members of staff whose responsibility it was to help the researcher. Many lessons were learnt through experience of organising these sessions. Like the training, the interviews could not be made compulsory. The interviews were generally given low priority particularly by the supervisors of the men involved.

At Factory A I met each supervisor and explained why the interviews were necessary. I also delivered a list of the people required for interview. Reactions from the supervisors were mixed. Some supervisors had volunteered for training and were generally helpful. Other supervisors required more persuasion to co-operate. A few workers were interviewed outside their working hours (for which they were paid overtime rates). Others could only be interviewed when machinery breakdown temporarily delayed production.

Supervisors were phoned or approached personally to fix firm interview appointments - usually for the next day. This task was performed by the Training and Safety Officer. Fortunately, he was popular with the workforce and knew the majority of employees by name. He was also enthusiastic about the aims of the project and received training himself, as did every member of the Personnel Department. The system of obtaining interviees worked reasonably well. When an appointment was missed it was possible to give a quick reminder and occasionally to obtain a replacement interviewee at short notice.

The interviews were approximately half an hour in length and were carried out in a quiet room away from the place of work. The interviewee was required to answer questions by marking interval scales, choosing from checklists or giving brief answers which were later coded. Before the start of each interview, the interviewer introduced himself and checked the identity of the respondent. Experience proved that it was also necessary to check whether or not the respondent had actually volunteered for first aid training. The following statement was then made to each interviewee:

> *'St. John Ambulance have asked us at the University to come along and find out about people's attitudes to first aid and some things related to it. We want to talk to some people who are going to take the first aid course and some who are not. Your name has been drawn out to be interviewed, and I want to ask you a few questions over the next 30 minutes or so. The answers you give me will be treated in complete confidence - no-one in the factory will know what you tell me, and no individual will be identified in any of our reports'.*

At the completion of the interview, the respondents were thanked for attending and told that their answers would prove very useful.

I carried out ninety interviews and Mr. A. R. Hale interviewed five matched pairs of interviewees.

Four main problems occurred in the pre-training interviews:

(1) Sickness. A number of appointments were missed through sickness. On one occasion the interviewee was in a severely disturbed state and the time was used as a counselling session.

(2) Several appointments were missed because the interviewee forgot to attend or because his supervisor had not informed him of the appointment.

(3) Certain interviewees were employed on jobs which were crucial to production and their absence would have resulted in severe disruption. This problem is discussed above.

(4) Delays were caused by industrial action, during which interviews could not be carried out.

<u>THE FIRST AID TRAINING AT FACTORY A</u>

Details of the development and content of the first aid training course used at Factory A and the training of instructors are given in Chapter 8.

Training was available in two ways:

(1) In four one-hour sessions from Monday to Thursday. These were designed to fit in with the shifts worked in the factory, morning, afternoon and evening sessions being available. It

was not always possible for the same instructor to be available for each of the groups' sessions.

(2) Saturday mornings from 9 a.m. to 1.15 p.m. including a fifteen minute break. In these sessions each group had the same instructor throughout.

Of the 138 people trained, 65 opted for the one hour, and 73 for the Saturday morning session.

The training was given over a fifteen day period in May and June of 1974 by St. John Ambulance lay instructors from Staffordshire. Classes consisted of up to ten trainees.

POST-TRAINING INTERVIEWEE SELECTION

Those interviewed pre-training had been the best matched pairs and for this reason it was decided that the same people should be interviewed post-training, wherever possible. The majority of matched pairs of respondents were still available for interview. However, four of those initially interviewed had left the firm and their matches were also omitted from the post-training interview sample.

Forty-six matched pairs of respondents were interviewed post-training. These interviews took place three months after training was completed.

THE POST-TRAINING INTERVIEWS

Details of how the post-training interview schedule developed from the pre-training schedule are given in Chapter 6.

The post-training interview schedule was designed to:

(a) measure the trainees' responses to their first aid training, and

(b) investigate the areas discussed in Chapter 3 again, and if possible measure changes in the responses of the two groups between pre- and post-training interviews.

This was the first time post-training interviews had been conducted and a further aim was to test the usefulness of the schedule.

The interviews were again about half an hour in length. However, the schedule contained more questions for trainees than non-volunteers and their interviews took slightly longer on average. The interviews took place in the same room as the pre-training interviews. At the end of each interview, respondents were asked whether they would mind spending a few minutes completing fifteen multi-choice answer questions about first aid (described in Chapter 8). It was made clear that the exercise was for research purposes only and that the scores would be entirely confidential. All respondents agreed to complete the questionnaire.

Before the start of each post-training interview the interviewer re-introduced himself and checked whether or not the interviewees had completed their first aid training. The following statement was made to the interviewees:

> *'I have asked you to come along and see me again to find out whether any of your ideas have changed since I last spoke to you. You may recognise some of the questions but I would ask you not to try and remember the answers you gave last time, but to answer the questions as if you had never heard them before. People's ideas often change over time and this interview is not meant to check up on you. Your answers will again be treated with complete confidence and you will not be identified in any report.'*

I conducted all of the interviews myself. No new problems occurred during the post-training interviews. There were fewer missed appointments than there had been during the pre-training interview exercise.

INJURY ACCIDENT DATA COLLECTION

Injury accident data were available for the whole factory but because only 18% of the work-force had been trained, it was thought that any improvement in their injury accident involvement would not show up in the total injury accident figures. It was decided that the injury accident data collected would be limited to those people who had been trained in first aid and their matched untrained controls. All trained employees who had left the firm before November 1974 were excluded from the sample together with all first aid trained staff and employees not directly involved on the shop floor. This left 91 shop floor operatives who had been trained in first aid, and their 91 untrained matched controls. These two groups were used for the injury accident data analysis. This procedure allowed a direct before-and-after comparison to be made of the injury accident involvement of the two groups. Of the 91 pairs of subjects included in the analysis, 36 pairs had been interviewed.

Two types of injury accident records were available:

(a) the accident reports resulting from all initial visits to the surgery for injury treatment, and

(b) the personal accident records

These two records were related in the following way. When an accident occurred details were recorded in the surgery. A typed copy of each accident report was sent to the Safety Officer and to the injured person's supervisor, and a copy was kept at the surgery. The details of the surgery copy were then supposed to be copied out onto the personal accident records.

An analysis was made of the personal records of the 182 people. This covered the period from their date of starting with the firm until October 1974. However, these records proved to be inaccurate when compared with the surgery accident reports and could only be used as an estimate of the situation prior to training.

A detailed analysis was carried out of the accident reports resulting from all first attendances at the surgery following an injury accident. Two four-month periods were chosen for comparison, one preceding the training (January to April 1974), the other immediately following the completion of the first aid training (July to October 1974). Unfortunately the pre-training period included the period of the three-day week, and the post-training period included the two-week summer break, rendering pre to post comparisons difficult. However, a pre-training comparison and a post-training comparison of injury accidents suffered by the two groups could be made. If the major hypothesis was correct it was to be expected that the trained group would have a reduction in the number of injury accidents relative to the number of injury accidents suffered by the matched control group.

CHAPTER 11

DISCUSSION OF RESULTS FROM FACTORY A

DISCUSSION OF RESULTS FROM FACTORY A

This chapter discusses the main findings from the study at Factory A. The raw data from the interviews are in Appendix 12 (pre-training data) and Appendix 13 (post-training data). The discussion is under the following headings:-

1. Differences between volunteers and non-volunteers before training.
2. Changes following training.
3. The structured interview as a research technique.
4. The first aid training.

1. DIFFERENCES BETWEEN VOLUNTEERS AND NON-VOLUNTEERS BEFORE TRAINING

When describing FACTS I, Atherley, Hale and McKenna (1973) stated:

> "It is possible that some people enrolled because they already had a strong interest in safety matters".

Epidemiological research has also shown that volunteers differ from non-volunteers, for example Smith et al. (1974) showed that volunteers for influenza vaccination tended to have better sickness absence records, irrespective of the presence of influenza. Therefor it was essential for the research hypothesis to distinguish between

(a) differences resulting from the first aid training, and
(b) differences between those who came forward for training and those who did not.

The matching process was designed to remove differences in job risk which would produce differences in exposure to hazard but it was essential to establish whether there were any pre-existing differences in knowledge and attitudes. Two questions needed to be answered:

(i) How were volunteers different from those who did not volunteer?

(ii) Since the one obvious difference was that one group came forward for training and the other did not, why did the people volunteer for training?

These two questions are answered in reverse order.

Reasons given for volunteering/not volunteering

The main reasons cited for volunteering were to be able to help others and to increase their own knowledge of first aid. Reasons given for not volunteering included lack of interest, not having spare time and not being able to face the sight of blood and/or injury. There was, however, no difference in the number from each group that had previously been trained in first aid. Therefore it would appear that the volunteers had a higher opinion of the usefulness of first aid and felt a greater need to be able to help other people. There was no evidence that volunteers expected to become safer as a result of their training.

Certain expected differences were found in the pre-training interviews.

More volunteers than non-volunteers had considered learning first aid before this opportunity arose. More of them also thought that everybody should be trained in first aid. The non-volunteers claimed to have felt sick more often after witnessing an accident. Any of these factors may have influenced people to volunteer for the first aid training.

Differences between volunteers and non-volunteers

Table 8 summarises the pre-training differences between volunteers and non-volunteers. A tick in the column headed 'NO DIF' indicates that there was no statistically significant difference between the matched groups in their interview responses or their reported injury accident involvement. A tick in the column headed 'SIG DIF' indicates that there was a statistically significant difference ($\alpha < .1$) between the interview responses of the two groups.

(a) Injury Accident Involvement

The injury accident data analysis showed a tendency for the volunteers to have had more injury accidents than the non-volunteers prior to training. While the difference was not statistically significant, it was unexpected because it was not in accordance with the hypothesis that volunteers were safer than non-volunteers prior to training. There were no differences between the responses of the two groups to the questions asking about injuries they had seen or experienced.

TABLE 8

PRE-TRAINING DIFFERENCES BETWEEN VOLUNTEERS AND NON-VOLUNTEERS

FACTORY A

TOPIC	NO DIF	SIG DIF
A. Reported injury accident involvement and claimed injury accident involvement		
Number of injury accidents reported in the four months prior to first aid training	√	
Types of injury incurred during that period	√	
Whether they had seen a serious injury	√	
Whether they had had a serious injury	√	
Type and area of serious injuries	√	
When last injured at work	√	
When last injured at home	√	
B. History, practice and knowledge of, and attitude towards first aid		
Number of respondents previously trained in first aid	√	
Rated ability to perform first aid treatments	√	
Number of respondents who had carried out first aid treatments	√	
How good they rated their treatment	√	
Whether they had a first aid box	√	
Whether they had a first aid book (asked post-training)	√	
Awareness of the most important first aid treatments	√	
Who they thought should know first aid		√
C. Awareness of danger/risk-taking		
Whether they were able to predict their most recent work injury	√	
Whether they can predict when accidents are likely to happen	√	
Whether they rated themselves safety conscious	√	
How dangerous they rated their job	√	
How likely they thought they were to get hurt doing their job		√

TABLE 8 (CONTINUED)

TOPIC	NO SIG	SIG DIF
C. Awareness of danger/risk-taking (continued)		
How they thought it was possible to injure themselves	✓	
Whether possible to remove guards and what would happen	✓	
Whether they thought they needed more personal protection	✓	
Whether they thought they needed eye protection		✓
D. Responsibility to act		
How many accidents in the factory they thought could be prevented	✓	
Who they thought could do most to reduce the number of accidents	✓	
Whether their most recent home injury could have been prevented	✓	
E. Recognition of safe behaviour and its availability		
No information was available on this topic		
F. Decision to adopt safe behaviour		
Rated worst type of injury	✓	
Rated worst area of injury		✓
Ways in which they were safety conscious	✓	
Whether the danger in their job worried them	✓	
How important they rated machine guarding	✓	
How well they thought their machines were guarded	✓	
How they felt about working on unguarded machines	✓	
Whether they thought guarding affected their work rate		✓
Whether they rated their protective clothing comfortable	✓	

TABLE 8 (CONTINUED)

TOPIC	NO SIG	SIG DIF
F. Decision to adopt safe behaviour (continued)		
Whether they thought their protective clothing interfered with their work		√
Whether they thought their personal protection was effective	√	
Why they started to use a seat belt	√	
Why they didn't use a seat belt	√	
G. Reported behaviour relevant to danger		
How much they claimed to wear their protective clothing	√	
How much they claimed to wear their seat belts	√	
How safe a driver they rated themselves		√

(b) (i) History of first aid training and practice

There was no difference between the number of respondents from each group who had previously been trained in first aid. There was also no difference in the number from each group who claimed to have carried out first aid.

(ii) Rated first aid ability and knowledge of first aid

There was no difference between the groups in their self-rated ability to carry out first aid treatments or in the first aid treatments which they thought were the most important.

(iii) Attitude towards first aid

The only statistically significant difference between the groups was on the question which asked who they thought should know first aid. More volunteers than non-volunteers claimed that everyone should know first aid, indicating that they rated first aid more useful. There was no difference between the number of respondents in each group who claimed to possess a first aid box or a first aid manual.

(c) Awareness of danger and risk-taking

The majority of questions designed to measure awareness of danger and risk-taking produced no statistically significant differences in response between the groups. However, the volunteers rated themselves more likely to be hurt while doing their job than did the non-volunteers.

(c) Awareness of danger and risk-taking (continued)

More volunteers than non-volunteers claimed that they needed eye protection. It can be argued that both these findings support the hypothesis that the volunteers for training were already more aware of danger than those who had not volunteered.

(d) Responsibility to act

Three questions investigated the respondents' responsibility to act to avoid injuries or accidents. No differences were found between the responses of the two groups.

(e) Recognition of safe behaviour

No questions produced evidence on this topic.

(f) Decision to adopt safe behaviour

The majority of questions designed to investigate the area of factors influencing the decision to adopt safe behaviour produced no significant differences in response. However, three questions did produce statistically significant differences between the responses of the two groups.

It had been predicted that if the volunteers for training were more motivated to adopt safe behaviour, they would have a clearer idea of the most serious types and areas of injury than the non-volunteers. However, the non-volunteers rated brain damage and paralysis higher and burns lower than non-volunteers. It could also be argued that by rating machinery guarding and protective clothing more of an interference to their work, the volunteers showed less willingness than the non-volunteers to adopt safe behaviour. The interpretation of this last finding however is open to alternative explanation.

2. CHANGES FOLLOWING THE FIRST AID TRAINING

As stated in Chapter 6, the large number of changes in the interview schedule, made pre- post-training comparisons of awareness and attitudes difficult. However, for the purposes of this discussion, such comparisons are made where possible. Table 9 summarises the post-training differences between volunteers and non-volunteers. As in Table 8, a tick in the column headed 'NO DIF' indicates that there was no statistically significant difference between the matches in their interview responses or in their reported injury accident involvement. A tick in the column headed 'SIG DIF' indicates that there was a statistically significant difference ($\alpha < .1$) between the interview responses of the two groups or between their reported injury accident involvement.

(a) Reported and claimed injury accident involvement

The raw injury accident data for Factory A is shown in Table 10. From the major hypothesis it was predicted that there would be an improvement in the injury accident rate of the volunteers between pre- and post-training. No statistically significant change in injury accident involvement occured. However, there was a tendency for the

TABLE 9

POST-TRAINING DIFFERENCES BETWEEN VOLUNTEERS AND NON-VOLUNTEERS

FACTORY A

TOPIC	NO DIF	SIG DIF
A. Reported injury accident involvement and claimed injury accident involvement		
Number of injury accidents reported in the period July to October 1974	√	
Types of injury incurred during that period		√
Whether they had seen an accident since the training period	√	
Whether they had had an injury since the training period	√	
B. Knowledge of first aid		
Multi-choice questionnaire - questions based on 'Digest' course		√
Multi-choice questionnaire - questions not based on 'Digest' course	√	
Awareness of the most important first aid treatments		√
C. Rated ability to perform first aid		
Rated ability to perform first aid treatments		√
Number who had performed first aid treatments since the training period		√
D. Attitude to first aid		
Who they thought should know first aid		√
How secure they felt with workmates trained in first aid		√
Whether they would prefer more to be trained in first aid		√
Whether they had a first aid box		√

TABLE 9 (CONTINUED)

TOPIC	NO DIF	SIG DIF
E. Awareness of danger and risk-taking		
How likely they thought they were to get hurt doing their job	√	
How they thought it was possible to injure themselves	√	
How dangerous they rated their job	√	
F. Responsibility to act		
How many accidents in the factory they thought could be prevented	√	
Who they thought could do most to reduce the number of accidents	√	
Whether they could do anything to cut down the risk of an accident	√	
Whether individuals or authorities could cut down risk of a car accident		√
G. Recognition of safe behaviour and its availability		
No information was available on this topic		
H. Decision to adopt safe behaviour		
How they felt at sight of injury		√
Rated worst type of injury	√	
Rated worst area to injure	√	
Rated seriousness of possible injuries at work		√
How well they thought their machines were guarded	√	
Whether they thought guarding affected their work rate	√	
Whether they thought their protective clothing interfered with their work	√	
Whether they thought their protective clothing was effective	√	

TABLE 9 (CONTINUED)

TOPIC	NO DIF	SIG DIF
I Reported behaviour relevant to danger		
How safe a driver they rated themselves		✓
How much they claimed to wear their seat belt	✓	
Whether they claimed to wear their seat belt more in the period since training	✓	

TABLE 10

INJURY ACCIDENT DATA - FACTORY A

FREQUENCY OF NUMBER OF FIRST ATTENDENCES AT SURGERY FOLLOWING INJURY

VOLUNTEERS		NUMBER OF FIRST ATTENDANCES AT SURGERY FOLLOWING INJURY	NON-VOLUNTEERS	
PRE-TRAINING	POST-TRAINING		PRE-TRAINING	POST-TRAINING
66	69	0	69	68
20	18	1	19	18
2	3	2	2	5
1	-	3	1	-
2	1	4	-	-

TOTAL NUMBER OF INJURY ACCIDENTS REPORTED BY THE EXPERIMENTAL AND CONTROL GROUPS

	VOLUNTEERS	NON-VOLUNTEERS
PRE-TRAINING	35	26
POST-TRAINING	28	28

TYPE OF INJURY ACCIDENTS

TYPE OF INJURY	VOLUNTEERS		NON-VOLUNTEERS	
	PRE-TRAINING	POST-TRAINING	PRE-TRAINING	POST-TRAINING
Burns	11	1	5	4
Lacerations	12	7	8	8
Contusions	5	11	3	4
Other Types	7	9	10	12

volunteers' injury accident rate to improve to that of the non-volunteers', who had suffered less injury accidents than the volunteers prior to training.

There was a significant change in the type of injury suffered by the trained group. Post-training the trainees suffered less burns and lacerations and more contusions than pre-training. This finding was difficult to interpret although it is possible to argue that contusions are less serious types of wounds than burns or lacerations. The difficulty of comparing the seriousness of injuries was discussed in Chapter 5.

There was no statistically significant difference between the number from each group who had seen or experienced injuries in the period following the training sessions.

(b) Knowledge of first aid

Results from the multi-choice questionnaire used at the end of the post-training interviews are shown in Appendix 14. Both the trained and untrained groups scored significantly higher on the questions based on the course than on those which were not. The trained group scored significantly higher than the untrained group on the questions based on the course. There was no difference between the mean scores of the groups on the questions which were not based on the course. Furthermore, the mean score achieved on the questions which were not based on the course were not significantly better than chance.

Spearman rank correlations were carried out to see whether there was a correlation between the scores on the questions based on the course and the scores on the questions not based on the course. The correlation for the trained group was -0.04, which was not significant. The correlation for the untrained group was - 0.319 which was significant at the .05 level. This finding suggests that there was no relationship between the volunteers' performance on the two sets of questions. It would appear that the four hour first aid course had not brought about a general increase in awareness of first aid treatments, and had not led trainees to increase their first aid knowledge by further study.

Findings from the multi-choice questionnaire appear to show that the trainees' knowledge of the areas covered on the first aid training course had increased significantly when their performance was compared with that of a matched sample of untrained respondents. However, the questionnaire had not been validated and it was not possible to rule out the possibility that the trained group would have scored higher than the untrained group prior to training. The finding that both groups scored the same on the questions which were not based on the course gives support to the value of the course for teaching first aid.

Further evidence that the knowledge of first aid of the trained group had increased came from the question asking about the most important first aid treatments. Following training the trainees responded with more of the life-saving first aid treatments and less with minor injury treatments than the non-volunteers. Similarly the volunteers gave significantly more of the topics which had been included in the training than the non-volunteers did.

(c) Rated ability to carry out first aid and first aid experience

More volunteers than non-volunteers had carried out first aid in the period between their training and the post-training interviews. This finding may have been due to the trainees feeling more confident in their ability to help and therefore offering first aid in situations which they would previously have avoided.

The trainees rated themselves significantly better able to deal with a serious injury compared both with their ratings before being trained, and with the untrained group.

(d) Attitude to first aid

All the questions designed to test attitude to first aid produced significant differences between the responses of the two groups post-training. More volunteers than non-volunteers thought that everyone should be trained in first aid and that more of their work-mates should be trained. The volunteers claimed to feel more secure than the non-volunteers, knowing that a number of the people around them at work had been trained in first aid. More volunteers than non-volunteers stated that they possessed a first aid box.

(e) Awareness of danger and risk-taking

There were no differences between the groups in their responses to the questions which measured awareness of danger and risk-taking.

(f) Responsibility to act

There was no significant difference between the groups in the number of accidents in the factory they thought could be reduced or in the groups which they thought could do most to reduce the number of accidents (the 'individual worker' was the most frequent response).

There was no significant difference in the number from each group who thought that they could reduce their chances of having an accident on the road. However, when asked what action other people could take to reduce the number of accidents on the road the volunteers responded with significantly more actions that could be taken by drivers and significantly less that could be taken by the authorities than the non-volunteers.

(g) Recognition of safe behaviour

No evidence was provided by the interviewers to judge the respondents' recognition of safe behaviour.

(h) Decision to adopt safe behaviour

Certain questions from the interviews measured the respondents' motiviation to adopt safe behaviour.

Evidence that the volunteers' knowledge about potential injury had improved (and consequently their motivation to avoid being injured had increased), was shown in two questions in particular.

Following training, the volunteers rated brain damage and paralysis more serious, and burns less serious when asked which type of injury they would least like to have. This new order of seriousness corresponded more than their pre-training order of seriousness, with that of the occupational health nurses. However, these changes in the responses of the trainees merely served to bring their views into line with those of the non-volunteers (whose order of seriousness did not change between pre- and post-training interviews.

On the question about which areas of the body they would least like to injure, both groups changed their order of importance between pre- and post-training interviews. However, the volunteers changed theirs more than the non-volunteers, rating the internal organs, head and back higher and the hands, face and legs lower. This result again suggests that the volunteers had developed a more appropriate awareness of the consequences of injury. Their post-training order of seriousness was again closer to that of the occupational health nurses.

One contrary piece of evidence was provided by the question asking about the seriousness of injuries they were likely to receive while doing their job. It was predicted that the volunteers would rate these possible injuries more serious than the non-volunteers on the post-training interviews. In fact, the opposite was found to be the case with the volunteers rating possible injuries less serious than the non-volunteers.

Following their first aid training the volunteers no longer rated their machinery guarding and personal protection as more of an interference to their work than the non-volunteers did. It could be argued that the trainees had become more aware of the need of this protection for the prevention of injury and consequently overlooked its inconvenience. It would follow that trainees might have become more motivated to use their protection than they were prior to training.

(i) Reported behaviour relevant to danger

The final hypothesis tested was that trainees would report the adoption of safer behaviour. It was predicted that volunteers would claim to use their personal protection and seat belts more often following training. This prediction was not supported by the results. When the interviewees were asked how much they wore their personal protection and seat belts there was no significant difference in their responses at the two interviews. Thirteen volunteers claimed to wear a seat belt more following their training, but so did eight non-volunteers over the same time period.

One finding did support the hypothesis. The volunteers again claimed that they were safer drivers than the non-volunteers did, and the difference in responses between the groups was more marked on the post-training interview.

CONCLUSIONS FROM THE INJURY ACCIDENT DATA AND THE INTERVIEW DATA ANALYSIS

No significant reduction was found in the number of injury accidents suffered by the trainees following their training. However, there was a tendency for their injury accident rate to improve towards that of the non-volunteers (this group showed no change over time).

No evidence was found to support the hypothesis that volunteers for first aid training are safer than people who do not volunteer for training. If anything, the findings suggested that the non-volunteers were more aware of the seriousness of injury and consequently more motivated to be safe.

Following training the volunteers' knowledge of first aid increased. They rated themselves better able to carry out first aid and more of them had performed first aid treatments than had non-volunteers in the period between the training and the post-training interviews. There was also evidence that the trainees developed a more positive attitude towards first aid.

There was no evidence that the volunteers became more aware of danger. One finding suggested that the trainees rated individuals more responsible for accident prevention than the authorities, compared with the non-volunteers.

There was some evidence that the volunteers became more motivated to avoid injury by becoming more aware of the seriousness of injury following training. However, the increase in motivation again appeared to bring their responses into line with those of the non-volunteers.

An interpretation of the results quoted above is that the volunteers for first aid training were less motivated to be safe and consequently had a worse pre-training injury accident record than the matched control group. Following training, the volunteers motivation to be safe increased to match that of the non-volunteers and their injury accident rate was reduced to the level of the untrained group. This is only a tentative explanation of the findings from Factory A and takes no account of some of the problems that came to light during the experiment. These problems included possible differences between the groups in their injury accident reporting rates, (the problem of under-reporting was discussed in Chapter 5) inadequacies in the interview schedule, and lack of consistency in the first aid training. The last two problems are discussed in the following sections.

3. THE STRUCTURED INTERVIEW AS A RESEARCH TECHNIQUE

Because the study at Factory A was used as a pilot for further factory studies a number of changes were made to the interview schedule following the pre-training interviews. The aim of these changes was to produce a more efficient research technique. A number of questions were changed from open-ended to multiple choice checklists as a result of the pre-training responses. The post-training schedule included new questions and left out some which had proved unsatisfactory. These changes made pre-post comparisons of the interview responses difficult.

Despite these difficulties it was clear that useful information was being derived from the interviews. Tentative answers to some of the hypotheses discussed in Chapter 3 could be made. However, it was clear from the analysis of the interview data that certain areas would need to be probed in more detail before answers could be given to some of the research questions. For instance, some measure of injury accident reporting levels was required, and more information was needed about perception of danger and risk-taking, responsibility for safety and accident prevention, and if possible, the recognition of safe behaviour.

Specific developments in the interview schedule are discussed in Chapter 16.

4. THE FIRST AID TRAINING

The first aid training at Factory A was regarded as a constant for the purposes of the study. It became apparent, however, from observation of the training sessions and from a de-briefing meeting after the study, that there were marked differences between instructors in the content and style of presentation of the sessions.

Reactions to and criticisms of the training

At the de-briefing meeting verbal and written reports were presented by the Safety and Training Officer of Factory A, the instructors, and myself. It was clear from these reports that there were several problems with the course. Despite this the Safety and Training Officer reported:

> *"The general comment was that the course was accepted by participants as being useful and one individual has cited an incident in which he was involved and the training he received became applicable. There appears to be a fair amount of interest in continuing to a full certificate course and the company has indicated its willingness to provide facilities for this at a future date."*

The major criticisms of the course may be looked at under four main headings; (a) continuity, (b) presentation, (c) information, and (d) course content, timing and delivery.

(a) Continuity

On the courses presented in four one-hour sessions different instructors were often used on each session. As a result there was a certain amount of overlapping of lecture information and omission of other material.

(b) Presentation

There was wide variation in the methods used by instructors to present the course material. Many instructors told of personal experiences (often irrelevant to the topic being discussed); one lecturer used slides he had prepared on an overhead projector; another instructor brought a friend who acted as a 'casualty' with synthetic wounds. Many other examples of individual variation in presentation were observed.

(c) Information

In certain instances instructors gave conflicting information on the treatment of injuries. This was most noticeable with the treatment of burns.. Some instructors stated that drinks could be given to burn victims and other said they could not. Some classes were told that people suffering burns should have the affected part immersed in water, while others were told that this should not done. These differences in treatment became apparent to trainees when they discussed the training they had received, and confidence was lost in the ability of the instructors.

The majority of instructors included ' cause and effect' examples in their training, despite being asked not to.

Similarly, specific safety information (for example, preventing access to medicines by children) was included in a few sessions.

(d) Course content, timing and delivery

Many instructors thought that one hour was too long for the introductory session and that more time should be allowed for each of the other three sessions. They also thought that four hours was too long a period for continuous training and that one hour sessions were too short.

A common suggestion was that the same instructor should teach the whole of the course to a particular group. Three reasons were given for this suggestion:

(i) The instructors were unaware of what topics had been covered in the previous sessions.

(ii) The trainees became used to the instructor's mannerisms and style of teaching. When the instructor was changed valuable time was lost while the trainees adjusted to the new style of teaching.

(iii) An instructor needs to assess the ability of the trainees and adjust the level and speed of his instruction accordingly. Again, time was wasted while a new instructor made his assessment.

The majority of instructors had a great deal of experience in teaching the sixteen hour certificated first aid course. As a result many experienced difficulty in adjusting to the four hour course. They had problems in deciding what to leave out and often had problems completing the topics in the time available. Instructors suggested that the course should be lengthened (to five hours or longer) or that certain topics should be left out to allow more time.

A further criticism made by the instructors was that some of the training rooms had been inadequate for teaching first aid, particularly those where no blackboard was available.

RECOMMENDATIONS FOR FUTURE TRAINING EXERCISES

As a result of the reactions to and criticisms of the first aid training course and the performance of the instructors, the following recommendations were made for future training exercises:

(1) More consideration should be given to the pre-training preparation of the instructors.

(2) Wherever possible the same instructor should take a class through the whole course.

(3) Where this was not possible, objective cards should be developed to indicate which topics should be covered in each session.

(4) The course should be delivered in two sessions, each of two hours. There should be a minimum of one day between the two sessions.

(5) A maximum of ten trainees should be allowed on each course to allow adequate time for the practical sessions.

(6) The first aid instruction should be standardised. Any differences of opinion about the correct treatment should be resolved before training began and should not become apparent during the training sessions.

(7) Personal experiences and opinions should be strictly avoided by all instructors. They should also avoid being drawn into discussions outside the scope of the four hour course. Anyone who continually asked for further information should be advised to take a certificated first aid course after completing the four hour course.

(8) Instructors should not introduce their own visual aids. A teaching aid pack should be developed and tested for use in future exercises. Instructors should be advised to leave behind teaching aids which they used in their normal first aid teaching.

The development of the first aid training course, the objective cards, and the teaching aid pack, and the training of instructors for factories B and C are discussed in Chapters 13 and 14.

PART IV: DEVELOPMENT OF METHODOLOGY

CHAPTER 12

DEVELOPMENT IN THE DESIGN OF THE STUDY

DEVELOPMENT IN THE DESIGN OF THE STUDY

The study at Factory A had proved to be a very useful pilot study for further factory studies. The necessary research techniques had been developed and tested and had been shown to be effective in measuring injury accident rates, awareness and attitudes. Despite these successes a number of improvements remained to be made. In particular the first aid training course and the training of instructors required refinement. The interview schedule had to be extended and tested in order to investigate in more detail the areas outlined in Chapter 3.

A further major problem was apparent. Although the findings of the study at Factory A did not allow the major research hypotheses to be rejected, they also did not give support to the Canadian claim that 'First aid training is associated with...an estimated 30% lower probability of accidents.'

At this stage in the project it was necessary to look again at the Canadian research and attempt to explain the differences between the two findings. During the study at Factory A more information had been received about the Canadian studies. This further information is discussed in Chapter 2. Close examination of the methods used in Canada and those used at Factory A highlighted three possible explanations for the difference in the findings:

(1) The Canadian first aid training was longer. It appeared that all trainees attended a course that was at least eight hours long.

(2) The Canadian training contained a strong safety orientation, including the use of 'cause and effect' examples.

(3) Propaganda was used relating first aid to accidents and invoking civic pride as a motivation to be safe.

A fourth factor could have led to the different results, but was beyond control. This was the cultural differences between Canada and Britain, particularly the differences in medical care and injury compensation.

Of the first three factors the first was beyond the control of the research design. As explained in Chapter 8 a longer first aid course was not acceptable to St. John Ambulance or to the factories approached. Factors 2 and 3 appeared to be the most likely explanations for the success of the Canadian studies and were ones which could most easily be studied.

At this stage it was decided that two further factory studies should be carried out. The major hypothesis remained; that training in first aid reduces people's injury accident rate and therefore no attempt was made to include safety training with the first aid training. However, it was decided that suitable selected 'cause and effect' examples could be included in the first aid training at one factory. These examples would be designed to relate the training to the trainees' place of work. It was possible that the trainee would then consider how injuries could happen to him while he was working and make an effort to avoid such injuries.

In the second factory the first aid training would be combined with first aid propaganda clearly linking first aid with accidents. Volunteers would be exposed to the propaganda prior to their training and for a period afterwards. It was postulated that the use of such propaganda would create a 'safety set' and affect the way a trainee approached his first aid training and the relevance he saw of it.

The general method used in these two further studies was the same as that used at Factory A(see Chapter 4). Again no mention was made of safety except specifically in the propaganda used in the third factory study. Further factories were approached and two, Factories B and C, agreed to take part in the studies. It was decided that first aid training incorporating 'cause and effect' examples would be most appropriate at Factory B because there were a large number and variety of hazards at the factory. Factory C was selected for the study which combined first aid training with first aid propaganda.

It was recognised that a controlled measurement of the effects of the 'cause and effect' examples and the first aid propaganda was impossible. Factory studies of this nature are long and expensive in terms of the resources used. Furthermore, the possibility of finding factories that were matched with respect to the many variables that would affect such a study was extremely small. Even if this had been possible, it is unlikely that both would have been willing to commit themselves to the expenditure of time and effort necessary to complete such a project. Factories B and C were therefore very different in the materials they produced, the types of hazard the workers were exposed to, and in many other ways. These differences made the interpretation of the results of the studies far more difficult than in a carefully controlled laboratory experiment.

Chapters 13 and 15 describe the development of the 'cause and effect' examples used at Factory B and the first aid propaganda used at Factory C.

CHAPTER 13

THE DEVELOPMENT AND EVALUATION OF THE FIRST AID TRAINING COURSE AT FACTORY B INCORPORATING 'CAUSE AND EFFECT' EXAMPLES

THE DEVELOPMENT AND EVALUATION OF THE FIRST AID TRAINING COURSE AT FACTORY B INCORPORATING 'CAUSE AND EFFECT' EXAMPLES

INTRODUCTION

As explained in Chapter 4, the three factory studies were in the nature of action research. As techniques were tried in each factory they were evaluated and improved upon. This was particularly true of the first aid training course and the training of the instructors. This chapter describes how these two types of training were developed for use at Factory B and how the 'cause and effect' examples were developed and incorporated in the training course. Chapter 14 describes the developments in the first aid course which resulted from experience gained at Factory B.

The content of the training used at Factories A and B, and the training of the instructors for those factories were considered by the St. John Ambulance personnel to be variables outside the responsibility of the researcher. I was allowed to attend the instructors' briefing sessions but not to actively participate.

Chapter 11 discussed the first aid training at Factory A. A number of criticisms were made of the training exercise, including the lack of standardisation of course content and the problems that the instructors had in coping with the new four hour course. The training exercise at Factory B was designed to overcome these difficulties, and to include 'cause and effect' examples intended to indicate the relevance of the first aid training to the trainees' working environment. Before these areas are discussed it is necessary to define the different types of first aid training.

'PURE' FIRST AID TRAINING

'Pure' first aid training may be defined as training which is free from 'cause and effect' examples and from safety training. A simple plan of this type of training is:

(a) description of type of injury

(b) the first aid treatment for that injury.

The intention at Factories A and C was to teach such 'pure' first aid. It was recognised that such training was rarely, if ever, used in normal first aid training. Instructors frequently describe their own experiences and talk about how injuries have occurred, and perhaps how they might have been prevented. First aid instructors argue that this approach adds interest and relevance to the sessions. However, the inclusion of safety in any form would have destroyed the major hypothesis which was limited to the effects of first aid training.

'CAUSE AND EFFECT' FIRST AID TRAINING

'Cause and effect' first aid training as used at Factory B was defined as training which included both the treatment of the injury and how that injury might have been caused. No methods of injury prevention were taught. A plan of this training was:

(a) description of type of injury

(b) example(s) of how that injury could have occurred

(c) the first aid treatment for that injury.

For example, a person may receive a fracture (a broken bone) from falling off a ladder, and the treatment is .....

FIRST AID AND SAFETY TRAINING

First aid and safety training is an extension of 'cause and effect' first aid training which includes how injuries may be prevented. A plan of such training is:

(a) description of type of injury

(b) example(s) of how that injury could have occurred

(c) how that injury could have been prevented

(d) the first aid treatment for that injury

THE CANADIAN TRAINING

Information from the Canadian studies (see Chapter 2) indicated that first aid and safety training was used. Although it has not been possible to gain access to the detailed content of the training used in the studies, the Canadian teaching manuals presently used are available (St. John Priory of Canada, 1974). These were being developed at the time of FACTS I. They are in the form of programmed learning texts, and examples are shown in Appendix 15. Examples of specific safety training for water, electrical safety, children and poisons are shown. In other parts of the booklets injuries are described and the reader is told how they happened. The reader is asked to say how that injury could have been prevented, and the answer is supplied. The correct first aid treatment for that type of injury follows.

A third technique used in the booklets is to give the first aid treatment for an injury and then to ask the reader how he would react to a specific situation in which that injury results.

These examples indicate how far the Canadians have standardised 'cause and effect' and safety examples, within the framework of their first aid training. No evidence, other than the FACTS studies, has been produced to indicate that these techniques have improved safety performance.

THE TRAINING IN THE FACTORY STUDIES

The major hypothesis tested in the factory studies was that training in first aid reduces people's injury accident rate. This hypothesis precluded any form of safety training. As mentioned above, the training at Factories A and C was designed to be 'pure' first aid. The 'cause and effect' examples used at Factory B did not indicate how the injuries described could be prevented. In all three factories the basic aim was to test the major hypothesis, that is to measure the effects of *first aid training* on injury accident involvement.

DEVELOPING THE 'CAUSE AND EFFECT' EXAMPLES FOR FACTORY B

The 'cause and effect' examples were intended to emphasise the relevance of the first aid training to the trainees' working environment. It was hypothesised that this would encourage trainees to think about how injuries could happen to them while they were working, and consequently to adopt appropriate safe behaviour. For this reason 'cause and effect' examples were developed which were taken from the environment of Factory B and the type of jobs carried out there.

Three methods were used to select the 'cause and effect' examples to be included in the first aid training at Factory B:

(a) An inspection of the works was made by the Training Officer of Factory B, St. John Ambulance personnel, and members of the Department of Safety and Hygiene.

(b) The factory accident records were investigated to determine the most common types of injury reported.

(c) Discussions were held with the Medical Officer of Factory B.

The examples gathered by these three methods were related to the areas taught in the 'Digest of First Aid' (*op cit*) emergency first aid course, and relevant examples were selected for inclusion in the first aid training courses. These examples were included in the objective cards developed for the use of instructors at Factory B (see below).

Certain problems became apparent during this procedure. It was found that certain processes at Factory B produced or used chemicals including; cyanide, organic phosphates, phosphorus and phosphoric acid, which required specialised first aid treatment when injury involving them occurred. For example, if asphyxia occurs following poisoning by cyanide or organic phosphates, mouth to mouth resuscitation should not be used, and burns caused by phosphorus and phosphoric acid require specialised treatment which is not included in general first aid training. It was necessary to make the instructors aware of the correct treatments for such injuries in order to answer specific questions from class members, should they arise. In the case of phosphorus burns instructors were asked to say that the affected areas should be continuously flooded with water to prevent drying and that the casualty should be removed immediately to the factory surgery for expert medical treatment. Every employee of Factory B should already have been familiar with the procedure.

TEACHING THE 'CAUSE AND EFFECT' EXAMPLES

At the briefing sessions for instructors some problems were anticipated. Comments made by instructors indicated that they were not clear about the 'cause and effect' aspects of the training. In an attempt to remedy this a short document was prepared and sent to instructors before they began teaching at Factory B (see Appendix 16). The document described the hazards and related them to the injuries they could cause. The document explained why the examples were being included in the training and stated that they would make the training more interesting and relevant to the trainees. The instructors also received a sheet issued by the medical department of Factory B which explained the first aid treatment for phosphorus burns.

Observation of the early first aid training sessions at the factory showed that the 'cause and effect' examples were not being adequately taught. Six reasons were suspected for this:

(a) The examples had not been adequately explained to the instructors during the briefing session.

(b) The instructors were not familiar with the substances and processes mentioned and found difficulty in using the examples.

(c) Some instructors had not prepared their lectures adequately and as a result omitted many of the examples.

(d) Some instructors admitted that they had not bothered to read the document which had been sent to them.

(e) Some instructors preferred to use their own experiences, or examples with which they were more familiar.

(f) Some instructors did not use their objective cards at all while teaching.

Following the training sessions a further attempt was made to make the trainees aware of the 'cause and effect' examples. The notes which had been prepared for use by the instructors were adapted to be sent to all trainees (see Appendix 17). The notes were printed in the form of a pamphlet which could be fitted into the 'Digest of First Aid', which they had received at the beginning of their training. The reason for the pamphlet was stated in the introduction as follows:

> *'The pamphlet shows how the injuries you learned to deal with could occur in your own surroundings at the factory. It will show how important training in first aid is in making you aware of how injuries are caused as well as how they are treated.*
>
> *We can only give a few examples here. You will be able to think of many more of your own from the plants and shops you work in. Whenever you read through your 'Digest of First Aid' think about how the injuries it describes could have been caused.'*

Sufficient copies of the pamphlet were sent to Factory B to be distributed to all trainees. However, it became apparent during the post-training interviews that many trainees had not received their pamphlet. Of the 38 trainees interviewed only 18 claimed to have received the pamphlet. On investigation it was found that the Personnel Department had sent the pamphlets to the foremen of each section, together with the names of the people in that section who had been trained. Some foremen had distributed the pamphlets as requested but others had only pinned them on the notice boards. In such cases it is reasonable to assume that they were not read.

Questions were included in the post-training interview schedule in an attempt to measure the effect of the 'cause and effect' examples. The responses are discussed below.

DEVELOPMENT OF THE FIRST AID TRAINING METHODS FOR FACTORY B

Chapter 11 discussed the problems highlighted in the first aid training courses at Factory A. In an attempt to improve the training two forms of training packs and objective cards for the use of instructors were devised. These developments were tested in public training sessions in Stafford. The training packs were evaluated in terms of cost, practicability and portability. The objective cards were evaluated by observation of the training sessions and through interviews with the instructors who had used them. The training pack and objective cards selected for use at Factory B are described below.

PRESENTATION OF THE FIRST AID COURSE

The course was presented in two two-hour sessions, the second session generally taking place on the day following the first. Instruction was given by members of the West Midlands County of the St. John Ambulance Association and Brigade. Where possible the same instructor presented both sessions to the same class.

THE FIRST AID COURSE CONTENT

The course was again based on the standard four hour 'Digest of First Aid' (*op cit*). The areas covered on the course were the same as those covered at Factory A. Objective cards were provided for use by the instructors. The 'cause and effect' examples to be used were written into the objective cards. The purpose of the objective cards was to remind the instructor of the topics which should be covered on each hour of the course. Instructors were expected to prepare their lectures adequately, so that the objective cards could act as prompts. A separate objective card was prepared for each of the four one-hour sections of the course (called sessions 1 to 4). The cards were as follows:

SESSION 1

1) To understand the principles and practice of first aid.
2) To be able to react to the accident situation.
3) To understand the limits of first aid, the priorities, and disposal of a casualty.
4) To have sufficient knowledge of the structure of the body.

Time Allowed - 1 hour

SESSION 2 RESUSCITATION

1) To understand the common causes of asphyxia and special treatments.
2) To understand and carry out efficiently the following:
   a. Mouth to mouth method (in light of exposure to chemical leakage, for example carbon monoxide and hydrogen sulphide, closed situations, and electrocution).
   b. External cardiac massage.
   c. The Holger Nielsen method (in possible asphyxia from cyanide and organic phosphates, which would make the mouth to mouth method impossible).

N.B. Chlorine asphyxia requires urgent medical treatment.

Time Allowed - 1 hour

SESSION 3

1) To recognise wounds and to control bleeding:

   a. Incised (from sharp drum edges after lid removed, glass, etc.)

   b. Lacerated (from swarf produced by cutting the ends of drums)

   c. Contused (caused by striking limbs etc. against protruding objects).

   d. Puncture or stab wounds.

2) To recognise internal bleeding, caused by:

   a. Reversing lorries, stacker trucks pinning workmen.

   b. 'Greenacre' injuries from cargo falling from lorries.

3) To understand and make a triangular bandage.

4) To recognise and apply prepared roller bandages.

5) To recognise fractures (caused by fork-lift trucks spilling loads, persons falling from heights, falling over railway lines).

6) To be shown the treatment of and short journey bandaging for fractures.

Time Allowed - 1 hour

SESSION 4

1) To know the types of burns and scalds and their treatments:

   a. Dry heat.

   b. Wet heat (from steam drains).

   c. Chemical (for example phosphoric acid. In such cases flood the affected area with water continuously, remove contaminated clothing, treat as burn. Immediate medical aid required. For ingestion of phosphoric acid - give plenty of water to drink, do not induce vomiting, immediately remove to hospital).

2) To recognise and understand the importance of shock and the correct treatment.

3) To recognise unconsciousness, the gravity of the condition, and the correct treatment. (Possible causes - transmitted force from landing on heels after fall, or heavy blow from falling object on safety helmet. Medical causes - fits, strokes etc.)

4) To receive instruction on the treatments of poisoning, crush injuries and blast injuries.

Time Allowed - 1 hour

The objective cards were prepared by members of St. John Ambulance. The inclusion of the 'cause and effect' examples made them appear complicated.

EQUIPMENT PROVIDED FOR THE FIRST AID TRAINING

The following equipment was provided for use by the instructors at Factory B:

1	Anatomic Anne	Wall Charts:	
1	Plastic head model	(a)	Body and skeleton
2	Blankets	(b)	Circulation
12	Triangular bandages	(c)	Fractures
6	No. 9 sterile dressings	(d)	Artificial respiration
6	No. 8 sterile dressings		

THE TRAINING OF INSTRUCTORS FOR FACTORY B

A one-day briefing session was held in Birmingham and was attended by 19 qualified lay instructors. They were given an outline of FACTS (Canada) and the objectives of the training in Factory B were explained. The instructors then completed a multi-choice first aid test paper. This test was carried out for two reasons. Firstly, it was used to gain a clear idea of the instructors' potential, and secondly, to make them aware of the need to become familiar with 'The Digest of First Aid', before instructing on it. The maximum possible score on the test was 20 and the scores ranged between 6 and 16 with a mean score of 10.5. However, in the event the score achieved on this test was not used as a criterion for selecting instructors to be used at Factory B, because the number of instructors available to lecture during working hours at Factory B was limited.

Following the multi-choice test, the instructors were introduced to the concept of 'cause and effect' first aid training, and the use of the objective cards. This was followed by a demonstration of the equipment to be used at Factory B.

The instructors were made aware of the problems that had occurred during the training at Factory A. They were requested not to introduce personal experiences or 'cause and effect' examples that were not on the objective cards. They were also requested not to introduce any safety training or to make use of any teaching aids of their own.

An instructor was appointed as co-ordinator for the project. His duties included organising the training sessions, acting as contact between the factory and the instructors, and observing some of the training sessions.

The success of the organisation of the training sessions at Factory B reflected the work carried out by the co-ordinator.

COMMENTS ON AND CRITICISMS OF THE FIRST AID TRAINING AT FACTORY B

(a) Comments on the training

A de-briefing meeting was held at the completion of training at Factory B. Verbal and written reports were presented by the Training Officer at Factory B, the instructors, the co-ordinator, and myself. Many problems had been noted by the senior instructors observing the training sessions (see below). The Training Officer at Factory B was less critical of the training. He stated that the training had been well received and that the standard of instruction had been satisfactory. He had experienced difficulty in fitting employees into convenient classes because of the shift system in operation. He noted that trainees had been drawn from a wide variety of departments and he hoped that they would 'preach the gospel' to other members of their departments and influence a safer approach to the job. A number of those trained had expressed a desire to take a full certificated first aid course and he hoped that the size of the work's first aid team would increase.

(b) Criticisms of the first aid training

Observation of the first aid training sessions indicated that the instructors were not teaching in the way they had been requested to. A number of instructors ignored the objective cards and taught from experience or directly from 'The Digest of First Aid'. Additional treatments were introduced often at the expense of the basic methods of treatment. For example, one instructor spent some time demonstrating how to make a ring pad for bandaging a wound which contained a foreign body but omitted the treatment for serious bleeding. Practical sessions were frequently inadequately conducted, for example one successful inflation of the Anatomic Anne was often accepted as evidence that a trainee was capable of mouth to mouth respiration. Extra visual aids were introduced, many of which (for example a skeleton) only resulted in confusion of the trainees. Instructors were sometimes drawn into discussions outside the scope of the four hour course, for example about the functions of the spleen and the liver, and the methods used to replace diseased joints. One instructor attempted to explain the purpose of the project (incorrectly) and to relate it to the Canadian research. The 'cause and effect' examples were often omitted or replaced by personal experiences, which were frequently irrelevant. One particularly unfortunate session resulted in complaints from course members. On this occasion the wife of an instructor attended his class and contradicted many of the statements he made. From these observations it was clear that far more extensive training and selection of instructors was necessary before training commenced at Factory C.

Feedback from the instructors indicated that they felt there was too much subject matter to cover, particularly in sessions 3 and 4. They also felt that there was a lack of practical work in these sessions. However, they felt that the 'cause and effect' examples helped to keep the attention of class members, as did the use of Anatomic Anne. There was general agreement that the small class numbers helped to make the sessions less formal and allowed attention to be given to individuals when necessary. They were satisfied with the equipment and training rooms which were provided.

THE 'EFFECTIVENESS' OF THE 'CAUSE AND EFFECT' EXAMPLES INCLUDED IN THE TRAINING AT FACTORY B

As stated above, observation of the training sessions at Factory B indicated that the 'cause and effect' examples were inadequately taught. Attempts to overcome this problem were largely unsuccessful. A question was included in the post-training interview schedule in an attempt to measure the impact of the examples. Respondents were asked to give an example of an accident which could lead to somebody:

(a) stopping breathing,
(b) bleeding badly,
(c) being seriously burnt, and
(d) having a fracture.

In no case did the trainees give significantly more examples that were included on the objective cards than non-volunteers. This finding confirmed the view that the 'cause and effect' examples had little effect on the trainees. The responses were also analysed in terms of whether the examples given were industrial or not. There was no significant difference on b, c or d, but on a the non-volunteers gave relatively more industrial examples and relatively less non-industrial examples than did the volunteers. It seems reasonable to conclude that the trainees were not encouraged to relate their training to their place of work. This evidence from the interviews confirmed that from the observation of the training sessions. In conclusion, the introduction of specific 'cause and effect' examples was unsuccessful and the training at Factory B was similar in nature to that at Factory A.

RECOMMENDATIONS FOR FUTURE FIRST AID TRAINING EXERCISES

As a result of the observation of training sessions at Factory B and comments made during the de-briefing meeting the following observations and recommendations for future first aid training exercises were made:

(1) It became obvious that the 'Digest of First Aid' was not suitable as a teaching manual. Its usefulness was limited to being a reference booklet. It was necessary that the four hour first aid course should be rewritten for use at Factory C. Before this could be done it was necessary to look at the aims of the training and how these could be achieved most satisfactorily. Wherever possible topics irrelevant to the aims of the course should be omitted and more time allocated to the essential life-saving techniques. The new course should provide more time for practical work.

(2) It was noticed during the training sessions at Factory B that the instructors with the most extensive experience of teaching on the 16 hour certificated first aid courses generally had the greatest difficulty in teaching the digest course. They often had problems limiting themselves to the

essential aspects of the treatments and tended to introduce information which was irrelevant to a four hour emergency first aid course. Many instructors were attempting to give a synopsis of the 16 hour course in the four hours available to them and did not realise that the four hour emergency first aid course was a completely different course with different aims. It was recommended that instructors should be trained to teach the four hour course from first principles. It was also recommended that instructors should be selected for Factory C who were not experienced in teaching on certificated courses and who showed themselves to be capable of teaching to a suitable standard. It was recognised that this would limit the number of available instructors.

(3). More tightly worded objective cards were required. These should not only include the main areas to be covered but should also indicate the important points to be made. The new objective cards should be developed from the rewritten course rather than from the existing objective cards.

(4) More time should be allocated to training the instructors. They should be introduced to and taken through the new course and should be trained in the use of the new objective cards.

(5) Instructors should be encouraged to undertake better preparation of the sessions in accordance with the objective cards provided.

At this stage of the project it was recognised by the St. John Ambulance personnel that I should be actively involved in the development of the first aid training course and the training of the instructors.

CONCLUSIONS FROM THE FIRST AID TRAINING AT FACTORY B

Many problems had been found with the first aid training at Factory B. These included inadequacy of the teaching manual and objective cards, insufficient training of instructors, and lack of preparation by the instructors. The 'cause and effect' content of the training had similarly proved unsuccessful. However, many valuable lessons had been learnt about the training course, the training of instructors and other aspects of such a large scale training exercise.

The following chapter describes the development of the training course used at Factory C, and the methods used to overcome the problems highlighted by the training at Factory B. Major changes were made in the content of the training and the training of instructors. These attempts to improve the first aid training reflected the action research nature of this project. It was not possible to wait until the study at Factory B was complete before re-designing the first aid training, because the studies at Factories B and C overlapped and there was only a period of three months between the training at the two factories.

It has to be accepted that the study at Factory B was not a satisfactory test of 'cause and effect' first aid training. In many ways the training was not significantly different from the training at Factory A on this dimension, although it was far better organised and effective in other respects.

CHAPTER 14

THE DEVELOPMENT AND EVALUATION OF THE FIRST AID TRAINING COURSE AT FACTORY C

THE DEVELOPMENT AND EVALUATION OF THE FIRST AID TRAINING COURSE AT FACTORY C

As explained in Chapter 12 the study at Factory C was designed to test the effect of first aid training and first aid propaganda on injury accident involvement. The first aid training to be used was 'pure' first aid as defined in Chapter 13. This chapter describes the development of the new first aid training course for use at Factory C, the training of the instructors, and evaluates the presentation of the first aid training. Chapter 15 describes the development of the first aid propaganda used in conjunction with the first aid training at Factory C.

DEVELOPMENT OF THE NEW FOUR-HOUR FIRST AID COURSE

As explained in Chapter 13 the 'Digest of First Aid' was found to be unsatisfactory as a teaching manual. Therefore, it was necessary to develop a set of instructors' notes which provided each instructor with the information which should be included in the training sessions. Before these instructors' notes could be produced it was necessary to establish the aims of the four-hour first aid course. These were arrived at by discussions between the researcher and senior instructors from St. John Ambulance. They took into account limitations resulting from the short time available for training, the instructors available and the capabilities of the trainees.

THE AIMS OF THE FIRST AID TRAINING COURSE

1. The course should concentrate on the essential life-saving treatments, particularly the maintenance of life during the time

before expert medical aid could arrive. To achieve this more time should be allocated to these treatments (resuscitation, the arrest of serious bleeding, care of the unconscious patient, and the treatment of shock) and less to the treatment of injuries which were unlikely to lead to death (for example minor bleeding and fractures). Training should also be limited to those treatments which were within the ability of trainees and which could adequately be taught within the time limits of the course (for example mouth to mouth resuscitation, the recovery position, and the control of serious bleeding).

2. Since first aid is essentially a practical subject, trainees should demonstrate their ability to carry out the life-saving techniques efficiently. The course should include as much practical work as possible to achieve this aim. The inclusion of more practical work would also help to maintain interest and attention and break up the monotony of a two hour session (it had been noted in the observation of earlier training sessions that trainees found two hours too long to sit and listen to a lecture).

3. Non-essential information should be omitted wherever possible, though it was recognised that certain background information, such as the position of the lungs, was valuable as an aid to understanding the basic principles.

4. Wherever possible technical terms and jargon should be avoided. It was agreed that explanations should be kept as simple as possible.

5. Adequate time should be allowed for questions either during or at the end of each session. These should include queries from course members and when time allowed, questions from the instructor to test comprehension and retention of the most important information. Instructors should be asked to avoid being drawn into areas outside the scope of the four hour course in response to questions.

6. To allow sufficient time to cover the theory and practical sessions adequately, class sizes should be limited to an average of five members, although it was noted that such a limitation might prove prohibitively expensive in a large scale training exercise.

7. The course should not include either accident prevention or safety training in any form. The course should be designed to be 'pure' first aid training except where standardised 'cause and effect' examples were necessary to explain how injury could occur. For example, a meaningful explanation of the causes of asphyxia involved the use of standardised examples, such as pressure on the chest, or strangulation preventing the ability to take in oxygen. Such examples were not drawn from specific industrial situations and were not intended to have the same effect as those used at Factory B.

The detailed course content (described below) emerged after these overall aims had been elaborated by the production of instructors' notes.

THE DEVELOPMENT OF THE INSTRUCTORS' NOTES

Three sets of notes were prepared by senior lay instructors of St. John Ambulance. These notes were largely based on the 'Digest of First Aid' but also included sections from the authorised manual of the St. John Ambulance Association and Brigade (1972). The three sets of noted differed not in course content but in the emphasis placed on various topics. Several meetings were then held between the senior lay instructors and myself. The purpose of the meetings was to allocate the time which should be spent on each section of the course and to prepare the final text of the instructors' notes. The final form of the instructors' notes was acceptable to all who attended the meetings.

The notes were designed to indicate to instructors how much detail should be covered on each topic, which 'cause and effect' examples should be used and when the teaching aids should be introduced. The instructors' notes were not supposed to be used as lecture notes. It was intended that the instructors should use the notes for preparing their lectures before they attended any training session. New objective cards were developed which could be used during the actual training sessions. These objective cards are described below.

MAJOR CHANGES IN THE FIRST AID TRAINING COURSE

Listed below are the major changes in the first aid training course resulting from the development of the new instructors' notes.

1. The section covering the structures and functions of the body was omitted. Where such information was necessary to explain the nature of an injury it was included with the first aid treatment for that injury, and was kept to a minimum. For example, at the beginning of the section on asphyxia a brief mention was made of the position of the lungs and how they functioned. The section concerned with the principles and practice of first aid was allocated less time.

2. Resuscitation was limited to mouth to mouth and mouth to nose respiration. The Holger Neilsen method of resuscitation and external cardiac massage were omitted for the following reasons:

   (a) The simplest and most effective method of artificial ventilation available to the first aider is mouth to mouth respiration (Proctor and London, 1977).

   (b) St. John Ambulance had decided that external cardiac compression should only be taught on certificated first aid courses since the technique was a difficult one to master and required extensive training, practice, and ideally, the use of expensive equipment which was not available for these training exercises.

   (c) More time was needed for practice of the mouth to mouth and mouth to nose methods of artificial respiration. In the previous training sessions it had been noted that instructors were satisfied that the trainee was capable of efficiently carrying out the technique if he achieved one successful inflation. With more time, each trainee could practice the techniques and show that he was capable of achieving the correct rhythm for efficient artificial respiration.

3. Less time was allocated to the treatment of fractures because such injuries were unlikely to lead to death, particularly in the time taken for expert medical aid to arrive. Only two types

of fractures were described, 'open' and 'closed'. The majority of time allocated to fractures was used as a practical session on the immobilisation of a fractured leg to enable the patient to be transported to hospital.

4. The time allocated to the miscellaneous treatments was reduced and discussion was limited to the treatment of poisons.

5. More time was allocated to the treatment of shock and unconciousness. It had been observed at Factory B that these forms of injury were not adequately covered in the training sessions.

6. The session dealing with the control of bleeding was extended and concentrated on severe bleeding. More time was devoted to practical work in this session.

7. The section dealing with the treatment of burns and scalds was lengthened.

8. A summary of the course was added to the last session. This had three main purposes:

   (a) to remind trainees of the main points of the course;

   (b) to issue the trainees' copies of the 'Digest of First Aid' and to explain how it differed from the course taught. Special mention was made of the exclusion of external cardiac massage;

   (c) to determine and answer any queries about the topics taught and to thank the trainees for attending.

9. The time available for practical work was increased from approximately 1¼ to 2 hours.

10. Each topic was covered in the following way:

(a) Definition of the injury.

(b) Signs and symptoms of the injury.

(c) Treatment of the injury, and

(d) Practice of the treatment where appropriate.

11. The order in which the topics were covered was altered to reflect seriousness and to distribute practical sessions throughout the four hours.

THE OBJECTIVE CARDS

The objective cards were developed from the new instructors' noted. They were designed to be used as a guide to the instructor during the training sessions. They contained more detail of the areas to be covered in each session than the objective cards used at Factory B and also gave suggested timings for each section of the session. The objective cards used at Factory C are shown below.

OBJECTIVE CARD 1

1) The principles and practice of First Aid.

2) Resuscitation

   (a) Definition of asphyxia.
   (b) Lungs and their function.
   (c) Causes of asphyxia:
      i. Affecting airway and lungs.
      ii. Affecting oxygen in blood.
      iii. Preventing use of oxygen.
   (d) Signs and symptoms of asphyxia.

3) Carry out efficiently the following: mouth to mouth method.

4) Common causes of asphyxia.

Timing	1	-	5	minutes
	2	-	10	"
	3	-	40	"
	4	-	5	"
TIME ALLOWED		-	1	hour

OBJECTIVE CARD 2

1) To recognise and understand the importance of shock:

   (a) Definition.
   (b) Signs and symptoms.
   (c) Treatment of:
      i. nerve shock.
      ii. general treatment.
   (d) Class practice of treatments.

2) Unconsciousness: Levels of unconsciousness.
   Testing technique of levels.
   Practice of treatment.

3) Poisons: Definition.
   General rules for treatment.

Timings	1	-	30 minutes
	2	-	20 "
	3	-	10 "

TIME ALLOWED - 1 hour

OBJECTIVE CARD 3

1) Wounds and Bleeding

(a) Blood volume.

(b) Definition of types of wounds (incised, lacerated, contused, puncture).

(c) Treatment of minor wounds.

(d) Severe bleeding and its consequences.

(e) Control of severe bleeding and its treatment.

2) Bandages and their application

(a) To recognise and apply prepared sterile dressings.

(b) To understand, make and apply a triangular sling and improvised slings.

Timings	1	-	30 minutes
	2	-	30 "

TIME ALLOWED - 1 hour

OBJECTIVE CARD 4

1) Burns and scalds

(a) Definition of types of burns and scalds.

(b) Signs and symptoms.

(c) General rules for treatment.

(d) Questions.

2) Fractures

(a) Definition of a fracture.

(b) Types of fractures (open and closed).

(c) Signs and symptoms.

(d) General rules for treatment.

(e) Demonstrate short bandaging for fractured lower limb.

3) <u>Summary</u>

Timings	1	-	25 minutes
	2	-	25*	"
	3	-	10	"

* 10 minutes Theory
15 minutes Practical

TIME ALLOWED - 1 hour

EQUIPMENT PROVIDED FOR THE FIRST AID TRAINING

The following equipment was provided for use by the instructors at Factory C:

1 Anatomic Anne.
1 Plastic head model.
2 Blankets.
12 Triangular bandages.
6 No. 9 sterile dressings.

Wall Charts: (a) Body and skeleton
(b) Circulation
(c) Artificial respiration

Different coloured heading cards showing the priorities and important first aid treatments. (To be used in the introduction and summary of the course).

PRESENTATION OF THE FIRST AID COURSE

The course was presented in two two-hour sessions. They were held on Tuesday and Thursday, or Wednesday and Friday of the same week, either in the morning or the afternoon. It was possible for trainees who missed the second session to attend the second session of a later course. Instruction was given by seven members of the West Midlands

County of the St. John Ambulance Association and Brigade. Because of the availability of instructors, only half the classes received instruction from the same instructor on both sessions.

THE SELECTION AND TRAINING OF INSTRUCTORS

Observation of the first aid training at Factory B had indicated the need for more extensive training of instructors for Factory C. All 17 instructors who volunteered for the training exercise at Factory C attended a briefing day and most also attended three evening training sessions. All the meetings took place in Birmingham.

The briefing day began with a demonstration of the standard teaching equipment and its use. Each instructor was given a topic from the instructors' notes and asked to give a five minute lecture on that topic using the equipment where necessary. The lectures had two functions: to show the potential of the instructors, and to indicate to them the need for detailed preparation before training at Factory C.

The objective cards were shown to the instructors and they were shown how to use them. The researcher then outlined the problems which had occurred in the training at Factories A and B and asked the instructors to avoid these. The purpose of the project was explained and it was emphasised that personal experiences and 'cause and effect' examples other than those written into the instructors' notes should be avoided. The instructors were then presented with their instructors' notes and objective cards and requested to familiarise themselves with these before attending the three evening training sessions which were held the following month.

Six instructors decided not to attend the evening training sessions or were unavailable because of prior commitments. These instructors were not used at Factory C. The instructors who attended were re-introduced to the objectives and nature of the training exercise at Factory C. They were taken through the objective cards and the suggested timings were explained.

The following points were made to the instructors:

(a) The time allocated for practical work should be used for that purpose.

(b) Adequate time should be allowed for questions either during or at the end of each topic. If, due to small class sizes, practical sessions finished early, instructors should use the extra time to test the trainees' comprehension of the topic.

(c) They should not be drawn into subjects which were not included on the objective cards.

(d) Every opportunity should be taken to stress the importance of shock and its presence with all other injuries.

The senior instructors then demonstrated each section of the course, including the use of the equipment and the objective cards. The instructors were then tested on their ability to carry out the practical demonstrations. Finally, each instructor was asked to give another short lecture from the instructors' notes and these were discussed and criticised by those present.

From the instructors who attended the evening training sessions seven were selected as being of a high enough standard to instruct at Factory C. Of these seven instructors, four had been used at Factory B. None of those selected had experience of instructing on certificated first aid courses. The training sessions at Factory C were allocated to these seven instructors.

COMMENTS ON AND CRITICISMS OF THE FIRST AID TRAINING AT FACTORY C

A de-briefing meeting was held following completion of training at Factory C. Verbal and written reports were presented by the Training Officer at Factory C, the seven instructors used and myself.

Comments on the training at Factory C

The Training Officer at Factory C reported that the feedback from the trainees had been good. He had had only two adverse criticisms and they had come from people who had previously been trained on certificated first aid courses. He felt that it had been a difficult task for the instructors to teach all that was required in the time available, and that they may have been hard pressed. From the sessions he had attended it had been obvious that the lecturers were new to this type of teaching.

The instructors reported that the trainees had been interested and had participated enthusiastically. The smaller class sizes had resulted in better interaction and friendliness than at Factory B. Instructors who had been used at Factory B felt that the new course's content was better and the tighter guidelines were a great help. Two instructors working together had produced 'idiot cards' from which they had lectured. These were based on the instructors' notes but contained more detail. The instructors reported that time problems decreased as they became more experienced with the course. They also found that a short break in the middle of each two-hour session was useful.

Certain instructors reported that they had experienced difficulty in avoiding the use of 'cause and effect' examples although this had not been a major problem. One instructor thought that his class had been distracted by the first aid posters displayed in the training room.

Criticisms of the training at Factory C

No major criticisms were made of the training at Factory C. The extra attention given to training the instructors was reflected in their performance. It was noticed that the inexperience of some of the instructors showed initially and this indicated that the instructors would have benefited from more experience of teaching the course before teaching at Factory C. One problem was caused by the attendance of senior instructors at a few of the sessions. One instructor reported that this had affected his performance, particularly as he was inexperienced at teaching the course.

GENERAL COMMENTS ON THE TRAINING

The more rigorous approach used at Factory C resulted in a higher level of standardisation of training and less problems occuring. The instructors preferred the tighter guidelines and extra training they received. During the instructor training sessions their enthusiasm for the project increased and this was carried over to the first aid training sessions at Factory C. Most of those instructors who were unable or unwilling to spend the time necessary for preparation of their instruction dropped out of the exercise at an early stage, before they had undertaken training at the factory.

Many valuable lessons were learnt about the selection, training and motivation of instructors. Not least of these was that the more the lecturers were involved in the project, the more effort they were willing to spend in the preparation of their lectures, and in ensuring the success of the first aid training.

RECOMMENDATIONS FOR THE CONDUCT OF FUTURE FIRST AID TRAINING EXERCISES

A short questionnaire was sent to each of the seven instructors used at Factory C. The following comments and recommendations resulted:

(1) The average class size of six trainees was satisfactory. If one or two trainees dropped out, the size of class did not fall below the minimum number acceptable to the instructors. Classes should not have more than ten trainees.

(2) Unless there were exceptional circumstances, the same instructor should be used for both two-hour sessions. Observation of the sessions confirmed that rapport between instructor and class on the second session was greater when the same instructor was used.

(3) The balance between theory and practical work on the four-hour course should not be altered radically.

(4) The reason why classes were being observed should be explained to all instructors before the start of a training exercise. Preferably one, but a maximum of two observers, should attend any training session. Senior instructors should not attend the first few sessions given by an inexperienced instructor. Ideally, all instructors should be given experience in teaching the course before being introduced to training in a study of this kind.

(5) Instructors who had taught at both Factories B and C did not agree on the best type of training. Two preferred teaching the 'pure' first aid and two the 'cause and effect' first aid.

Three important lessons were learnt from the training at the three factories. Firstly, good organisation was essential for the smooth running of a project of this type, preferably with local control. Secondly, no time spent in training instructors was wasted. Thirdly, if the instructors were made aware of the aims and constraints of the project they would go to great lengths to co-operate.

CONCLUSIONS FROM THE TRAINING IN THE THREE FACTORY STUDIES

Three major points became clear during the first aid training at the three factories:

(a) The four hour emergency first aid course was not a synopsis of the sixteen hour certificated first aid course, but was a completely different course. As such, it was necessary to employ instructors who had been specially trained to teach the four hour course. Instructors who had a great deal of experience of instructing on certificated courses found the greatest difficulty in teaching the four hour course.

(b) St. John Ambulance possessed no teaching manuals. The 'Digest of First Aid' like other St. John publications was useful only as a reference book. As a result it was necessary to develop a text which instructors could use as a teaching manual.

(c) In a project of this kind, there was a need for a standardised form of training. Observation of the training sessions at Factories A and B indicated that standardisation had not been achieved.

Although it was not possible to validate the training at Factory C, far less problems were observed during the sessions. However, there is a great deal of scope for large-scale investigations of first aid training in this country. This project has served to highlight some of the problems. Answers are required to the following questions:

i. What are the aims of the training; what skills are required of trainees?

ii. What areas should be included in the first aid training?

iii. How far can the training be standardised?

iv. What teaching manuals are available for the training?

v. What equipment should be provided for first aid training?

vi. How should the instructors be selected and trained?

vii. What mechanisms are available for monitoring the standard of the instruction?

viii. How is it possible to establish whether the aims of the training are being achieved?

ix. How should the competence of trainees be examined?

One particular problem arose from the improvement in the first aid training provided at each of the factories. Any measured difference in the improvement in injury accident rates could be due to two separate factors; the improvement in the first aid training, or the extra experimental variable;'cause and effect' examples at Factory B, and first aid propaganda at Factory C. This problem arose because of the action research nature of the project. One of the aims of the research was to develop a first aid training package suitable for use in a community study. This was achieved with the consequent loss of control of one of the experimental variables - a standard first aid training course. However, as shown in Chapter 13 attempts to introduce standard 'cause and effect' examples into the training at Factory B were largely unsuccessful. As a result, the character of the first aid training at each of the three factories was not radically different. The differences between the training at the three factories were mainly in content and presentation.

CHAPTER 15

THE FIRST AID PROPAGANDA AT FACTORY C

THE FIRST AID PROPAGANDA AT FACTORY C

INTRODUCTION

As explained in Chapter 12, it had been decided that first aid propaganda should be used in conjunction with the first aid training at Factory C. Evidence from FACTS I (see Chapter 2) indicated that many different forms of propaganda had been used. This propaganda freely discussed the aims of the project and how successful it was proving to be. People were requested to make Orillia the safest place in Canada - by learning first aid. Trainees were asked to be safety conscious and to look for hazards. No attempts were made to measure the effects of this propaganda independently of the total package.

The first aid propaganda used at Factory C was not intendedto have the same purpose as that used at Orillia and care was taken to avoid the propaganda being the major variable tested. The first aid propaganda was intended to have an effect similar to the 'cause and effect' examples at Factory B which was to indicate the relevance of the first aid training to the trainees' working environment. However, the 'cause and effect' examples gave specific information (i.e. a particular action or process which could have caused the injury) whereas the first aid propaganda id not specifically relate injury to its cause.

This chapter discusses the nature of the first aid propaganda, factors affecting its design and use, and the problems involved in measuring its effect.

THE NATURE OF THE FIRST AID PROPAGANDA

Propaganda is defined in Chamber's Twentieth Century Dictionary as 'any association, activity, plan etc., for the spread of opinions and principles'. Morgan and King (1966) described propaganda as 'the deliberate attempt to influence attitudes and beliefs'. In the context of safety it is possible to dispense with any pejorative connotations associated with propaganda as it is intended not to mislead, but to correct attitudes and beliefs and to produce safer behaviour among the workforce.

It is often difficult to distinguish propaganda from education, and generally it is not necessary to do so. However, Sell (1974), defined safety propaganda as:

> *"...an organised attempt to change attitudes towards safety, and to cause people to act in a safe way but excluding those situations where the target population is undergoing a period of formal instruction."*

This definition appears artificial. Both safety training and safety propaganda attempt to 'change attitudes towards safety, and to cause people to act in a safe way'. Sell appears to be drawing a distinction merely for the convenience of limiting the scope of his review. No such distinction is made in this thesis.

Two types of propaganda are in general industrial use; advertising and safety propaganda (Kay, 1971). FACTS I used both forms of propaganda. Advertising techniques were used to attract the attention of firms, the media, and potential trainees. Safety propaganda was included in publicity reports which related the first aid training to accident prevention (see Chapter 2).

Advertising propaganda was used in all three factory studies to attract volunteers for training. This propaganda concentrated on the treatment benefits of first aid training and made no mention of safety or accident reduction.

It is possible to differentiate a third form of propaganda which will be called first aid propaganda. This is distinct both from advertising propaganda as it does not attempt to increase the numbers of volunteers for training, and from safety propaganda as it is not an attempt to change attitudes towards safety or to cause people directly to act in a safe way. The aim of the first aid propaganda was to create a perceptual set in those who had already volunteered for first aid training, which influenced the way they approached their training, and applied their knowledge following it. Thus they were required to be exposed to the first aid propaganda prior to their training and for a period afterwards. The perceptual set to be created was that the training was relevant to their working environment and that they would become safer as a result of that training.

It was necessary to decide on the form the propaganda should take, the design of the propaganda, and how it was possible to measure its effect. These decisions are discussed below.

SELECTION OF THE FORM OF FIRST AID PROPAGANDA

The following forms of propaganda were considered:

(a) films,

(b) verbal messages - either personal or broadcast over loudspeakers,

(c) leaflets or company magazines, and

(d) posters.

(a) Films were inappropriate because of the cost of production and the time necessary to make them.

(b) Verbal messages, in the form of a short talk to be delivered at the beginning of each course, appeared to be a suitable form of propaganda. However, it was impossible to guarantee the availability of a suitable person to give this talk to every course, and it would have been difficult to ensure that a standard message would be given on each occasion.

(c) Indications from Factory B were that leaflets were largely unread, even when they were successfully delivered. It seemed impossible therefore to guarantee that all trainees would be exposed to this form of propaganda.

Two further problems with all three methods described above were that the non-volunteers would not have been exposed to the propaganda, and that the trainees would not have been continually exposed to the propaganda. While recognising that the first aid propaganda was directed exclusively at the volunteers for training, it was not possible to exclude the possibility that the propaganda in itself might influence injury accident involvement, particularly as the form of propaganda used depicted situations where hazards were evident. Ideally all employees should have been exposed to the propaganda. The employees who did not receive first aid training could then function as a partial control group for the effect of the first aid propaganda, and particularly for the measurements of recall of the propaganda on the post-training interviews.

As explained above, it was necessary for the volunteers to be exposed to the propaganda prior to training and for a period following it. The forms of propaganda described above could not have achieved this.

For all the above reasons and because of the advantages set out below, posters were selected as the most appropriate forms of propaganda. The main advantages of posters were:

(i) They were relatively easy to design and cheap to produce.

(ii) They were easily displayed to all employees (both experimental and control subjects).

(iii) They were a standard stimulus in that each person was exposed to the same message, although the responses to this stimulus were likely to differ to a large extent, particularly between volunteers and non-volunteers.

(iv) Each poster would be seen on numerous occasions rather than on a single occasion and they could be displayed over an extended time period.

(v) They could be displayed in the training room during the course of the first aid training sessions.

CRITERIA FOR THE DESIGN OF THE FIRST AID PROPAGANDA

No studies have been done to evaluate propaganda of this kind. The nearest form of propaganda was orthodox safety propaganda* and it was necessary to look at work in that area in order to seek guidance for decisions about the design of the first aid propaganda. Work on safety propaganda (e.g. Laner and Sell, 1960; Pirani and Reynolds, 1976) indicated that posters which were specially designed could produce specific behavioural changes over a period of time.

*See Sell (1974) and Hale (1974) for reviews of safety propaganda.

This section describes the decisions that have to be made in the design of a safety poster campaign and how these were incorporated in the design of the first aid poster campaign.

The I.L.O. (1971) produced the following guidelines for the design of posters:

(a) The thought or message should be self-evident at a glance without one having to take time to study it.

(b) The message should be clear and unambiguous.

(c) Posters should concentrate on the positive aspect of prevention.

(d) The poster should deal with safety or health problems over which the worker has control.

(e) The message on the poster should be directed at the individual and worded so as to indicate the relevance of the safety measure to the reader and reduce the possibility of the worker dismissing the advice as being directed as his workmates only.

(f) Posters should be appropriate to the work being done in the area where they are displayed.

(g) Gory and horrifying illustrations of serious injuries should be avoided.*

(h) Illustrations should be technically correct.

(i) Posters should be changed frequently.

Most of these guidelines are self-evidently correct. However, some further discussion is required of the aspects of specificity, realism and display of the posters.

*This finding has been supported by a number of studies including Piccolino (1966) and Wilkins and Sheppard (1970).

SPECIFICITY AND REALISM

Piccolino (1966) studied the effects of threat, realism (drawings versus photographs) and specificity (the use of the slogans 'safety first' versus 'grasp the handrail when boarding flights') on passenger's behaviour when boarding aircraft. He found that there was no difference in behaviour associated with either the level of realism or the specificity of the message. The latter finding is in conflict with the findings of Leventhal et al (1965). In their study of the effects of fear and specificity on the tendency to go and have anti-tetanus injections they found that specific instructions were more likely to produce an effect than either high or low fear.

It is possible that the level of specificity was not important in Piccolino's study because grasping the handrail was the obvious means of putting 'safety first' when boarding a plane. In the Leventhal et al. study, specific instruction were given explaining how to get the injections, and the subjects had to go out of their way to gain this protection. It would seem that specific messages are important where the correct action or the message of the poster is not obvious or where it is complex or would require effort by the reader to discover.

In the present study the connection between first aid training and safety was not obvious. For this reason it was necessary to use specific slogans such as: 'First aid makes you think safety', and 'Training in first aid opens your eyes to danger'.

As stated above, Piccolino found no difference between photographs and drawings, the realism of the posters. However, drawings do have one major advantage over photographs. They are able to emphasise the important details and leave out irrelevant, distracting details. For this reason drawings were preferred for use on the posters at Factory C.

THE DESIGN OF THE POSTERS FOR FACTORY C

Initial attempts to produce posters were unsatisfactory because they were produced by an artist who was not familiar with industrial situations. As a result it was necessary to employ a professional industrial artist, experienced in the design of safety posters. However, this increased the cost of production considerably and it was therefore necessary to limit the scope of the designs. The artist was given the task of producing four posters, each with a different message. In an attempt to limit the cost of designing the posters only two of the four included drawings. The posters are shown in Figures 5 to 8.

The slogans used all related first aid to some aspect of safety and were directed at the individual. The slogans used were as follows:

Poster A	First aid makes you safer - you know if makes sense.
Poster B	First aid training makes you safer - research proves it.
Poster C	Training in first aid opens your eyes to danger.
Poster D	First aid makes you think safety.

The artist was given the general instruction that the posters should be colourful and clear. On the two posters with drawings, the following stipulations were made:

FIGURE 5 - POSTER A

Aston University

Illustration removed for copyright restrictions

FIGURE 6 - POSTER B

Aston University

Illustration removed for copyright restrictions

FIGURE 7 - POSTER C

FIGURE 8 - POSTER D

(i) The drawings should relate to the message on the poster.

(ii) They should depict safety rather than first aid topics, that is they should avoid pictures of bandages or injuries.

(iii) They should be of general appeal to the employees of Factory C and illustrate situations found in that factory.

(iv) The processes or situations depicted should be technically correct.

(v) A man in each drawing should clearly be both trained in first aid and also employed on a normal production job (that is not a full-time or part-time first aider). In other words he should be similar to the volunteers following their training.

(vi) The first aid trained man should be noticing a hazard and taking active steps to put it right.

The final designs were as follows:

Poster A was in two shades of blue (light and dark).

Poster B was pink with red lettering.

Poster C was yellow with black lettering and line drawing. It depicted a worker with the words 'first aid' on his safety hat noticing a leaking steam-pipe and telephoning to report the hazard.

Poster D was green, again with black lettering and line drawing. The drawing showed a man opening a wooden case without protection and another (again identified as first aid trained) offering him gloves and eye protection.

The posters each measured 20 x 15 inches.

LENGTH OF DISPLAY

One major area of dispute in poster campaigns is the length of time that the posters should be displayed. Sell (1974) reported that both The Royal Society for the Prevention of Accidents and the British

Safety Council, the main suppliers of safety posters in this country, believed that posters should be changed regularly, with a maximum display of about ten working days. Pirani and Reynolds (*op cit*) found that the effect of their posters on the use of protective clothing was impressive for the first two weeks but that after four months the improvements were eroded. However, their posters carried the messages 'be careful' and 'be cautious' and it was not reported whether they were relevant to protective clothing or how long they were displayed.

In Laner and Sell's study of the effect of specially designed safety posters (*op cit*), one of the most interesting findings was that after the posters had been displayed for three months the improvement in behaviour effected by the posters was '... at least maintained if not further accentuated'. The authors suggested two possible explanations for this; (i) that the posters acted as perpetual reminders, and (ii) that they established or reinforced habits of working which were self-maintaining and that the presence of the posters was irrelevant. The authors were not able to show which of these explanations was correct. However, neither explanation implied that an extended period of display would lessen the impact of the posters. At Factory C it was hoped that the posters would continually remind trainees of the relevance of the first aid training to their work and so it was decided to leave the posters on display as long as possible. The posters were displayed from one week prior to the commencement of the first aid training until the post-training interviews were about to begin. Some of the posters were removed earlier to make room for other posters which management wanted to display. This was agreed to because it was desirable that the first aid training exercise (including the posters) should not interfere with the normal safety programmes used at Factory C. However, the majority of the posters were displayed for a period of six months.

ORDER OF PRESENTATION

Laner and Sell used three different posters, although all three had the same message on them. In three steel works all the posters were displayed simultaneously, while in three further works they were displayed consecutively at fortnightly intervals. They found almost identical changes in behaviour in both groups of works. However, they argued that the consecutive display had a more difficult job to do as the pre-experimental level of 'correct' behaviour in the consecutive display works was twice as high as that in the simultaneous display works.

At Factory C it was decided that a simultaneous display of the posters was necessary for the following reasons:

(a) Each poster had a different message.

(b) Only two of the posters had drawings and it was felt that the other two would not be as effective displayed on their own.

(c) The posters were only displayed for one week before the start of the training. As a consequence, the posters would have been changed too frequently, with a very short display of each.

(d) The posters were to be displayed for a relatively long time after the training.

(e) It was not possible to guarantee that the posters would be changed at the appropriate times because the process was tedious and time consuming. This was confirmed by the finding that at the end of the display period several sets of posters were still displayed even though the Training and Safety Officers at Factory C believed they had all been taken down.

The posters were displayed in groups of the four different designs.

THE SITING OF THE POSTERS

Few industrial studies have looked into the siting of posters. Laner and Sell displayed their posters in areas of the works where the behaviour depicted was appropriate, in a position where they would be visible for most of the working day. Special attention was paid to places where the target population was likely to congregate, such as tool stores, clocking-in points and loading bays.

One study carried out by the Transport and Road Research Laboratory (1972) investigated the siting of road safety posters. They found that:

> *'The site needs to be selected carefully for relevance, and the poster...should be designed so as to be easy to read and several should be put up at the recommended windscreen height to ensure that the chances of their being read and understood are as high as possible'.*

The locations of the posters at Factory C were selected by the Training Officer and Safety Officer, both of whom were experienced in running poster campaigns. Thirty sets of the four posters were displayed throughout the factory, covering all the workshops and other places where the employees gathered, including the canteen. Two sets of posters were displayed in the training room.

MEASURING THE 'EFFECTIVENESS' OF THE FIRST AID PROPAGANDA

The first aid propaganda could have been said to be effective if it had resulted in the trainees relating the first aid training to their working environment. Three main methods have been used to measure the effectiveness of safety propaganda (Sell, *op cit*):

(1) attitude change

(2) behaviour change

(3) recognition and recall

In the present study the first two measures were not appropriate.

(1) The interview schedule measured attitudes to first aid and safety, the topics depicted on the posters. However, these attitudes were also influenced by the major research variable, the first aid training, and the effects of the two variables could not be disentangled.

(2) The first aid propaganda was not designed to alter behaviour directly, but to create a perceptual set. Any measured change in behaviour could not have been directly linked to the first aid propaganda.

This left only the third type of measure. Belbin (1956) investigated the effects of various kinds of propaganda on childrens' use of pedestrian crossings. The most interesting finding was that tests of recognition and recall showed that there were no differences between the scores of those who used the crossings correctly and those who did not. Laner and Sell (*op cit*) obtained similar findings. Other studies have shown that propaganda has been acted upon when the target population could not recall the posters (Miller, 1939; Lazarus and McCleary, 1951) and also that respondents have claimed to have seen propaganda before a campaign has started (Sheppard, 1968). For any communication to have an effect it must be perceived and understood. However, these findings illustrate the risk in assuming that recognition and recall are adequate or meaningful measures of the effectiveness of propaganda.

Despite the above evidence, the only possible measure of the effect of the first aid propaganda was recall of the posters. A question was therefore included in the post-training schedule at Factory C to test the respondents' recall. A question included in the pre-training schedule at Factories B and C provided a comparative measure of recall as a method of testing the 'effectiveness' of posters. This question asked respondents to recall the posters which were used to advertise the first aid training.

THE 'EFFECTIVENESS' OF THE POSTERS

(1) Advertising posters

About an equal number of volunteers and non-volunteers at both Factory B and C stated that they had learnt about the first aid training courses from the advertising posters. Significantly more volunteers than non-volunteers at both factories claimed that they had been influenced in some way by the advertising posters. At Factory B the volunteers were significantly better able to recall the colours of the poster, and at both factories the volunteers recalled significantly more of the wording on the posters.

Thus, the groups were equally exposed to the posters, but the volunteers had been more influenced by them and were also better able to recall the information on them. These results suggest that the ability to recall the posters was in this case related to the effect that the posters had on the respondents.

(2) First aid propaganda

An equal number of volunteers and non-volunteers at Factory C stated that they had seen the first aid posters. There were no significant differences between the groups in their ability to recall the posters. However, as shown above (Belbin, *op cit*; Laner and Sell, *op cit*) it is not possible to conclude that poor recall of propaganda indicates that it has not been 'effective' in achieving its aim.

Respondents were also asked to give examples of how certain types of injuries could have occurred. When the answers were divided into industrial and non-industrial examples it was found that the non-volunteers gave relatively more industrial examples, and less non-industrial examples than the volunteers on three of the four types of injury. This difference was in the same direction but less marked at Factory B. Thus, it would appear that the trainees at Factory C were even less likely to relate their first aid training to their working environment than those at Factory B. It would seem reasonable to conclude that the first aid propaganda did not achieve its aim of making the trainees relate the first aid training to their working environment.

One possible explanation of the apparent lack of impact of the first aid propaganda was that the posters made statements which were accepted as obvious by both the trained and untrained respondents. It became clear during the interviews that respondents were not able to distinguish the first aid posters from safety posters. When asked to describe the first aid posters many respondents from both groups described safety posters that had been displayed in the factory at the same time. Respondents appear to make no distinction between the terms 'first aid' and 'safety'. This was noticeable among those respondents who suggested that accidents could be prevented by more training for workers. When asked what sort of training, they responded; safety training, first aid training, or both, and I was left with the impression that no great distinction existed in their minds. At no time during the study at Factory C did any respondent express surprise at the statements on the posters which linked first aid training with safety.

CONCLUSIONS ON THE FIRST AID PROPAGANDA

The first aid propaganda had been introduced to create a perceptual set in the trainees, that the training would be relevant to their working environment, and to influence the way in which they 'used' their training in their subsequent work. Evidence from the interviews suggested that the propaganda did not achieve these aims.

In conclusion, there was no evidence that the first aid propaganda influenced the effect of the first aid training on injury accident involvement. Despite this, it was not possible to conclude that the workers at Factory C were not influenced in some way by the posters. It would appear however, that the first aid training at Factory C combined with the first aid propaganda did not differ greatly in nature from the training at Factories A and B. If this were the case, the major differences between the three factory studies would be in the content and standard of presentation of the first aid training.

CHAPTER 16

DEVELOPMENTS IN THE INTERVIEW SCHEDULES FOR FACTORIES B AND C

DEVELOPMENTS IN THE INTERVIEW SCHEDULES FOR FACTORIES B AND C

INTRODUCTION

Further changes were made to the pre-training interview schedule for Factories B and C as a result of experience with the schedule used at Factory A and from two further pilot studies with the redesigned schedule at manufacturing factories in the West Midlands. The post-training schedule for use at Factories B and C was kept as similar as possible to the pre-training schedule to allow as many pre-post camparisons of responses as possible. The same schedules were used at Factories B and C.

REASONS FOR DEVELOPING THE SCHEDULES

It was shown in Chapter 11 that the interviews had proved to be a useful research tool but that certain changes in the schedule were still required. The main aims of the redeveloped schedules were as follows:

(1) To include questions which were capable of being comprehended by respondents, avoiding ambiguity and leading questions (except where included for a particular purpose).

(2) To remove the need for prompting respondents by including in the questions prompts which had proved useful in earlier interviews.

(3) To include more closed questions based on the responses to open questions in earlier interviews.

(4) To exclude questions which had proved irrelevant or unable to differentiate between the experimental and control groups.

(5) To investigate in more detail the important areas outlined in Chapter 3, and those areas that had appeared important in earlier interviews.

(6) To investigate certain areas specific to Factories B and C; the 'cause and effect' examples, and recall of the first aid propaganda.

CHANGES IN QUESTIONS APPLICABLE PRE-TRAINING ONLY

Interviewees who had received first aid training before were not asked who had trained them, when they were trained, or whether they still felt competent to carry out first aid. These questions were replaced by one asking why they had first decided to learn first aid, and by a question to those who had not previously been trained asking them why they had now decided to learn first aid. Volunteers were also asked why they had volunteered to be trained, and non-volunteers why they had not thought about volunteering to be trained. More information was obtained about the volunteers' expectations of the courses. Volunteers were asked whether they thought the course would lead them to change their attitudes to the way they worked or did anything else. They were also asked if they expected to learn anything else apart from first aid. This was an attempt to see if volunteers expected to learn about safety. One question seeking specific information about the advertising methods was also asked at both factories.

CHANGES IN QUESTIONS APPLICABLE PRE- AND POST-TRAINING

Five questions were dropped from the original schedule because they were felt to be outside the scope of the project or because they did not seem to be sensitive to change. They were the questions dealing with machinery guarding, first aid equipment and driving behaviour. Five questions had parts dropped which had proved ineffective.

Seven questions had their wording altered to avoid ambiguity and to make the meaning of the questions clearer to respondents. The coded response lists were altered on three questions in the light of experience from Factory A. The question about the consequences of serious injury was changed from a closed to an open question as it was felt that the responses listed were too leading and spontaneous responses were lost.

The form of four questions (or parts of questions) was changed in order to explore areas in more detail or to alter questions which had proved not to be useful.

Eight questions were added to the schedule for Factories B and C. These were intended to explore in more detail the areas of:

(i) perception of first aid,
(ii) perception of danger,
(iii) responsibility to act,
(iv) recognition of safe behaviour,
(v) motivation to adopt safe behaviour, and
(vi) behaviour relevant to danger.

Sixteen questions had parts added, with the aim of exploring the areas covered by these questions in more depth.

Only seven questions were the same post-training at Factory A and at Factories B and C. This made comparisons between the responses at Factory A and those at Factories B and C difficult.

CHANGES IN THE INTERVIEW SCHEDULE FROM PRE- TO POST-TRAINING

Very few changes were made in the basic form of the schedule for the post-training interviews. Certain differences (mainly in wording) were necessary because of the post-training nature of the schedule.

The question asking about dangerous activities undertaken away from work was dropped. Few respondents claimed to undertake such activities and those mentioned were generally carried out for interest or enjoyment (for example; sports, driving, and do-it-yourself activities). It seemed unlikely that first aid training would restrict such activities. One question was added to the schedule to see whether volunteers and non-volunteers thought they were equally likely to come across a situation requiring first aid knowledge. Another question was added to explore the respondents' perception of responsibility for accident causation. Three questions had parts added investigating preventability and perception of personal injury. At Factory C only, interviewees were asked how they found out about industries they had cited as being dangerous.

The pre-training and post-training interview schedules used at Factories B and C are shown in Appendices 18 and 19. The schedules used at the two factories had reached a stage in development at which useful comparisons could be made between the experimental and control groups, both pre- and post-training. Comparisons were possible between pre- and post-training responses given by the volunteers and non-volunteers. Finally, changes at the two factories could be compared.

PART V: THE STUDIES AT FACTORIES B AND C

CHAPTER 17

METHOD USED AT FACTORIES B AND C

METHOD USED AT FACTORIES B AND C

This chapter includes a brief description of the two factories and describes the specific methodology used in them and the problems which occurred in implementing it.

FACTORY B

Factory B was situated on a large site in a heavily industrialised part of the West Midlands. It produced bulk chemicals for a variety of industrial and domestic uses. The site contained a number of separate plants, which were largely automated, each producing different chemicals.

Approximately 600 production workers were employed, although this number varied as a result of demand for the products. During the course of the study the workforce was reduced by voluntary redundancies. The majority of the workers were semi-skilled or unskilled. Their jobs involved setting up reactions and waiting for these to finish, occasionally checking on their progress. A large number of more highly skilled maintenance staff were employed. The majority of employees were British but there were also a number of Asians, West Indians, Irish and Italian workers. This latter group had been recruited at a time when labour was scarce and they had subsequently settled in Britain.

The main hazards at the factory were the chemicals themselves, particularly; phosphorus, phosphoric acids, organic phosphates, and chlorine. Maintenance staff were exposed to machinery and electrical hazards.

The factory contained a surgery staffed by a sister and trained nurses, and there were a number of certificated first aiders and a factory fire service. There was a general lack of enthusiasm for first aid, demonstrated by the low attendance at meetings of the factory's first aid group. Members of the Personnel Department who had been given the job of organising the project were also unenthusiastic about the research. A Safety Officer was employed who retired and was replaced during the course of the project.

FACTORY C

Factory C was also situated in a heavily industrialised part of the West Midlands. Like Factory A it produced non-ferrous metal bar extrusions. The factory took in raw materials, which were melted down into billets in the furnaces. The billets were extruded through presses and the bars then went through a variety of finishing processes similar to those at Factory A.

The factory employed approximately 600 production workers. These were mainly semi-skilled operatives and skilled maintenance workers. The majority of employees were British although many Asian, West Indian and Irish workers were employed. The main hazards included sharp objects causing cuts, flying objects lodging in the eyes, noise during the finishing processes, burns from the foundry and presses, and objects falling. There were also hazards involved with working at heights, with machinery, and with electricity.

The factory contained a surgery staffed by a trained nurse and there were a number of certificated first aiders. No great interest had previously been shown in first aid but the members of staff involved with the project were keen, particularly with regard to injury prevention. The firm employed a Safety Officer.

SPECIFIC METHODOLOGY FOR FACTORIES B AND C

The same basic methodology was used at both factories. The following sections describe the methods used and some of the problems that were encountered.

ADVERTISING THE COURSES

Training was offered to all employees at the two factories. However, unlike at Factory A all experimental measures were restricted to production workers.

I discussed the project either formally or informally with supervision and union representatives. Two advertising posters were used at Factory B (Figures 3 and 4, Chapter 7) and the second of these was used at Factory C. Supervisory staff, union representatives and members of management issued personal invitations to certain workers. This method was used to concentrate on areas which were under-represented among the volunteers or where first aid training was particularly important because of the hazards present, e.g. the foundry at Factory C.

Questions were included in the pre-training interview schedule to assess how interviewees learnt about the course and how much of the information on the advertising posters they could recall (see Chapter 15).

SELECTION OF TRAINEES

An attempt was made to train all volunteers. Very occasionally it was impossible to find a course suitable for certain people, especially those who became unavailable towards the end of the training period and could not be added to a later course. The presentation of the training in two separate two-hour sessions, allowed volunteers to attend two separate courses if they were unable to attend both sessions of the same course. Other volunteers missed training because of illness. Some volunteers chose to drop out of the training. At Factory B, 113 employees volunteered for training and 102 completed the course. At Factory C there were 76 volunteers and 75 of these completed their training.

ALLOCATION TO COURSES

Training was carried out during working hours and volunteers were allocated to courses by members of the Personnel Departments at each factory. The St. John Ambulance co-ordinator was given lists of the dates and times of courses and he provided instructors.

SELECTION OF PRE-TRAINING INTERVIEWEES

An attempt was made to match each volunteer with an employee who had not volunteered for training, using the criteria described in Chapter 4. These criteria were, type of work done, length of experience on that type of job, age and nationality.

At Factory B matching for type of work was more difficult than at the other two factories. The production workers were grouped in small process plants and performed varied duties within these. Matches were selected from within the same plant, or where this was not possible, from a plant where similar processes and chemicals were used (that is, similar risks existed). Also at Factory B the majority of electricians volunteered for training and it was necessary to select some instrument maintenance workers as matches. Investigation showed that both groups were exposed to similar risks.

Pairs were selected for interview who were best matched in terms of age and job-specific experience, and who represented the various sections of the factory. Less employees were made available for interview than at Factory A. At Factory B 39 pairs were interviewed pre-training, and 38 pairs post-training. At Factory C 39 pairs were interviewed pre-training, and 37 pairs post-training.

THE PRE-TRAINING INTERVIEWS

The success of the organisation of the interviews was dependent on the co-operation of the factories. Arrangements for the interviews were given low priority by the personnel involved at both factories.

At Factory B the job of arranging the interviews was given to a junior secretary in the Personnel Department. The Personnel Department was separate from the Safety Department, and there was generally little enthusiasm for the project, which for them was an inconvenience. This lack of interest was reflected in the approach to the task of obtaining interviewees. Each request to the foreman of the potential interviewee was preceded by a statement to the effect that attendance was not essential. This became a convenient reason for non-attendance. Eventually the job was given to another member of the department who was generally well known and liked by the majority of employees. Her approach was to request the attendance of the interviewee at the Personnel Department and to explain the reason on their arrival. As a result the number of missed appointments was greatly reduced. The interviews took place during June and July 1975.

At Factory C the function of obtaining people for interview was given to the Training Officer. He was reasonably enthusiastic towards the project, attending the training sessions himself, and he knew a large number of the workforce. Initially, a number of those approached refused to take part, apparently because they were not informed about the reason for attendance. To remedy this a note was sent to each potential interviewee explaining what was required of him and correcting misconceptions of the purpose of the interviews. Unfortunately, they were asked to fill in and return a slip indicating their willingness to take part. As a result a large number failed to return the slip and it was necessary to approach them again to gain their co-operation. A number who had previously refused to be interviewed, agreed to, when they learnt what the interview entailed and why it was necessary. Interviews were arranged the same day and this reduced the number of missed appointments due to sickness, 'forgetfulness' and work commitments. The interviews took place during September and October 1975.

At both factories the interviews were about half an hour in length and were carried out in a quiet room away from the place of work. The interviewee was required to answer some questions by marking scales, some by choosing or ranking from lists of alternatives and others by giving brief answers which were later classified by the interviewer.

At the beginning of each interview the interviewer identified himself and stated that he was from Aston University. After the interviewee's identity had been checked and also whether he was a volunteer or not he was told that:

> *'St. John Ambulance have asked us at the University to come along and find out about people's attitudes to first aid and some things related to it. We want to talk to some people who are going to take the course and some who are not. Your name has been drawn out to be interviewed, and I want to ask you a few questions over the next 30 minutes or so. I am only interested in your opinions and experiences; the questions are not intended to trick you or to test your knowledge. The answers you give me will be treated in complete confidence - non-one in the factory will know what you tell me, and no individual will be identified in any of our reports.'*

I conducted the majority of the interviews. Because the factory studies were being used as pilot studies for a future community project, a limited number of interviews were conducted by Dr. A.I. Glendon and Mr. M. Pérusse, in order to give them experience of using the schedules. They each conducted interviews with three matched pairs of respondents at both factories. In general it was found that the redeveloped schedule was easier to administer, although problems occurred with some respondents who gave elaborate answers to the questions. To overcome this problem more time was allowed between interview appointments.

THE FIRST AID TRAINING

Details of the content of the first aid courses, the training of the instructors, and problems that occurred with the content, and during the training sessions are discussed in Chapters 13 and 14.

FACTORY B. The training was carried out during working hours, either in morning or afternoon sessions depending on the shift of the trainee. The course was given in two sessions of two hours, the second half taking place on the day following the first. The training took place over a period of three weeks (12 working days) during July 1975. Instruction was given by eleven members of the West Midlands County of the St. John Ambulance. The instructors gave varying numbers of lectures depending on their availability. In some cases one group of trainees received instruction from the same instructor on both sessions. More usually the two sessions were taught by different instructors. A total of 102 employees were trained in 12 classes which varied in size from 5 to 12 - an average of 8.5 per class.

FACTORY C. Training was again held during working hours. Courses were held on Tuesday and Thursday or Wednesday and Friday of the same week, either in the morning or the afternoon. As at Factory B it was possible for employees who could not attend their second session to attend that lecture at a later date with another group. The training took place over a four week period (16 working days) during October and November, 1975. Instruction was given by seven members of the West Midlands County of the St. John Ambulance. Again either one instructor instructed the same class on both sessions, or the two sessions were taught by a different instructor. As at Factory B, the number of sessions taught by each instructor varied according to his or her availability. 75 employees were trained in 13 separate four-hour courses. Each session was designed for delivery to five trainees, although the number per class varied between three and eight according to the availability of trainees. The average number of trainees per class was approximately six.

I attended about 60% of the training sessions at each factory. The purpose of this observation was; to check on the content of the training, the use of 'cause and effect' examples and teaching aids, the reaction of the trainees, and to note any other relevant details. Classes were occasionally attended by senior instructors and managers at the factories.

SELECTION OF POST-TRAINING INTERVIEWEES

As far as possible the same respondents were selected for the post-training interview. However, certain changes in the sample were necessary for the following reasons:

(a) A few volunteers had been unable to attend the training sessions and had to be excluded from the post-training interviews.

(b) A number of those interviewed pre-training had changed jobs or retired before the post-training interviews took place.

(c) A few respondents who had been interviewed pre-training refused to be interviewed.

(d) Certain selected respondents were absent through illness during the period of the post-training interviews.

(e) Occasionally non-volunteers had been trained. Where only one member of a matched pair could not be re-interviewed one of three actions was required:-

1. To replace him with another suitably trained or untrained matched employee.
2. To exclude both that person and his match.
3. To replace that person and his match with a new matched pair.

Because relatively few people had been interviewed pre-training it was necessary to select a number of new interviewees. Table 11 gives details of:-

(a) the number of volunteers for training,

(b) the number trained,

(c) the number interviewed pre- and post-training, and

(d) the number of new interviewees post-training.

The new list of names was given to the person responsible in each firm and arrangements were made for these employees to be interviewed.

THE POST-TRAINING INTERVIEWS

The post-training interviews were arranged and conducted in a similar way to the pre-training interviews. Generally, fewer refusals occurred as the interviewees were aware of what the interviews involved.

FACTORY B

The post-training interviews were conducted between December 1975 and February 1976 during a period of economic problems. The workforce was depleted by voluntary redundancies and these, combined with an increase in orders, meant that the supervisors were less willing to release people for interviews. The situation was complicated by the move of the Personnel Department to new offices, and the resultant difficulties. Many appointments were not kept and the co-operation from the work staff was not good. The pressure of contacting interviewees combined with her own work proved too much for the secretary involved and the task was taken over by the Deputy Personnel Manager. It was found that the delay following training had resulted in the purpose of the project

TABLE 11

NUMBER OF EMPLOYEES (a) WHO VOLUNTEERED TO BE TRAINED, (b) WHO WERE TRAINED, (c) WHO WERE INTERVIEWED PRE- AND POST-TRAINING.

	FACTORY B		FACTORY C	
	VOLS	N-VOLS	VOLS	N-VOLS
NUMBER OF VOLUNTEERS FOR TRAINING	113		76	
NUMBER CHANGING THEIR MIND/UNABLE TO ATTEND	11		1	
NUMBER TRAINED	102		75	
NUMBER INTERVIEWED PRE-TRAINING	39	39	39	39
NUMBER INTERVIEWED POST-TRAINING	38	38	37	37
NUMBER OF NEW INTERVIEW-EES (POST-TRAINING)	7	4	6	10
NUMBER OF REFUSALS/ LEAVERS/UNAVAILABLE FOR POST-TRAINING INTERVIEWS	8	5	8	12

being forgotten. It was necessary to write to each interviewee and their supervisor to explain what was needed. Following this the remaining interviews were quickly arranged and the exercise was completed with a minmum of further problems.

FACTORY C

The post-training interviews took place in May and June 1976. They had been delayed by the economic situation which, combined with the influenza 'epidemic' of early 1975, led to an absentee rate of 15% in the factory. In this situation the management would not consider allowing the interviews to start until three months after the originally agreed date.

Each interviewee was sent a letter explaining that the post-training interviews were to take place. They were requested to return a tear-off slip if they were unwilling to be interviewed. This method limited refusals to three. By arranging interviews for the same morning or afternoon the number of missed appointments was minimised. This exercise proved to be the most efficient of the six that had been conducted.

The interviews in both factories averaged half an hour with the schedule for volunteers taking slightly longer, and that for non-volunteers shorter than pre-training. The form of the questions was similar to pre-training and the interviews took place in the same locations.

Previously interviewed employees were again welcomed and thanked for coming. They were asked if they could remember being interviewed previously and were told that the interviewer wished to ask them a few more questions to find out what they thought of the course (volunteers only), and whether their ideas had changed about the topics covered last time. They were informed that the questions might seem familiar but that they should try to answer them as if they had not heard them before. They were again assured that their answers would be treated with strict confidence and that the interview would not take very long.

New interviewees were treated as the pre-training interviewees had been.

As pre-training I conducted the majority of interviews and a few were carried out by Dr. A. I. Glendon. Recommendations for future interview exercises are made in Appendix 20.

INJURY ACCIDENT DATA COLLECTION

The injury accident data was not collected until some time after the post-training interviews at each factory. This was to allow as long a period as possible following training for the collection of the injury accident data. At Factory B the comparison period was one year prior to the first aid training (July 1974 to June 1975) and one year following the completion of training (August 1975 to July 1976). At Factory C the comparison periods were ten months long. To control for seasonal variations in accident rates the two ten month periods covered the same ten months (December 1974 to September 1975, and December 1975 to September 1976).

The data collected were the number of first attendances at the factory surgery following an injury accident. This information was collected from the accident day book at Factory B and from the personal accident records at Factory C. These were found to be the most accurate sources of injury accident data at each factory. Any of the pairs of matched subjects who had not been employed for the whole of the pre-training and post-training comparison periods (July 1974 to July 1976 at Factory B, and December 1974 to September 1976 at Factory C) were excluded from the analysis. The number of reported injury accidents, pre-training and post-training, for the remainder of the matched groups was counted.

In order to test whether it was possible to combine the results of interviewed and non-interviewed subjects, Mann Whitney U tests were used to compare the distribution of the number of injury accidents suffered by the interviewed subjects with that of the interviewed subjects combined with the uninterviewed subjects. In none of the four conditions (volunteers, pre- and post-training, and non-volunteers, pre- and post-training) at either factory did the difference in distribution approach statistical significance. These findings allowed the interviewed and non-interviewed samples to be combined for the purposes of the injury accident frequency analysis. The resultant groups had 43 members at Factory B (25 interviewed, and 18 not interviewed) and 55 at Factory C (37 interviewed and 18 not interviewed).

CHAPTER 18

RESULTS FROM FACTORIES B AND C

RESULTS FROM FACTORIES B AND C

This chapter shows the results of the injury accident data analysis and the analysis of the interview data from Factories B and C. The results from the two factories are displayed together to facilitate comparison.

INJURY ACCIDENT DATA

As stated in the previous chapter, the measure of injury accident involvement used was the number of first attendances for treatment at the factory surgery following an injury accident. The frequency of such attendances by volunteers and non-volunteers at each factory is shown in Table 12. 43 matched pairs of subjects from Factory B were included in the analysis and from Factory C 55 matched pairs were included in the analysis. Table 12 also shows the combination of injury accident frequencies used in the histograms (figures 9-14).

Statistical Test

The Mann-Whitney U Test was used to test whether the experimental and control groups had similar distributions of injury accidents. Table 12 clearly shows that in all situations the majority of subjects reported either none or a single injury accident during the time data were collected. This distribution made the use of parametric statistics undesirable. The Mann-Whitney U test, which uses rank ordering, had the advantage of minimising the effects of subjects who reported large numbersof injury accidents, which would have distorted the mean number of injury accidents per group.

TABLE 12

FREQUENCY OF REPORTED INJURY ACCIDENTS

	FACTORY B				NUMBER OF INJURY ACCIDENTS		FACTORY C			
	VOLUNTEERS		NON-VOLUNTEERS				VOLUNTEERS		NON-VOLUNTEERS	
	PRE-TRAINING	POST-TRAINING	PRE-TRAINING	POST-TRAINING			PRE-TRAINING	POST-TRAINING	PRE-TRAINING	POST-TRAINING
FREQUENCY	13	18	16	11	0		22	26	31	31
	11	7	15	16	1		12	16	13	17
	6	5	3	7	2		11	9	4	2
	3	5	3	1	3		5	2	6	3
	5	2	4	3	4		4	1	-	-
	1	2	1	2	5		-	-	1	2
	1	2	1	-	6		1	-		
	1	-		2	7			1		
	-	-		-	8					
	-	1		-	9					
	1	-		-	10					
	-	-		1	11					
	-	-			12					
	1	-			13					
		-			14					
		-			15					
		1			16					
TOTAL NUMBER IN GROUP	43	43	43	43			55	55	55	55
FREQUENCY	24	25	31	27	0-1	0-1	34	42	44	48
	9	10	6	8	2-3	2-3	16	11	10	5
	6	4	5	5	4-5	4-7	5	2	1	2
	4	4	1	3	6-16					
TOTAL NUMBER IN GROUP	43	43	43	43			55	55	55	55

The null hypothesis in all cases was that subjects in the two groups compared had an equal frequency of reported injury accidents. A significance level of $\alpha = .1$ was adopted as an indication that the injury accident frequency of the group members differed. This level was chosen because of the exploratory nature of this study and the desirability of avoiding Type II errors. If similar trends were shown to occur at Factories B and C this would add confidence to conclusions based on a significance level of $\alpha = .1$. The actual values of α obtained are shown in Table 13.

RESULTS OF THE ANALYSES

Table 13 shows the results of the Mann-Whitney U Tests on the injury accident data and indicates which of the comparisons reached statistical significance. Four comparisons were made at each factory:

(1) The pre-training difference in injury accident frequency between the volunteers and the non-volunteers.

(2) The post-training difference in injury accident frequency between the volunteers and the non-volunteers.

(3) The change in the injury accident frequency of the volunteers between pre-training and post-training comparison periods.

(4) The change in the injury accident frequency of the non-volunteers between pre-training and post-training comparison periods.

From the results at Factory A (see Chapter 11) and the major research hypothesis, the following predictions were made:

(a) Pre-training, the volunteers would have a higher injury accident frequency.

TABLE 13

DIFFERENCES IN INJURY ACCIDENT FREQUENCY

FACTORY B	NUMBER IN EACH GROUP	OBSERVED VALUE OF Z*	SIGNIFICANCE** LEVEL
1) PRE-TRAINING DIFFERENCE (VOLS vs. NON-VOLS)	43	1.32	.09+
2) POST-TRAINING DIFFERENCE (VOLS vs. NON-VOLS)	43	0.46	.32
3) CHANGE IN VOLUNTEERS (PRE- vs. POST-TRAINING)	43	0.66	.25
4) CHANGE IN NON-VOLUNTEERS (PRE- vs. POST-TRAINING)	43	1.18	.12
FACTORY C			
1) PRE-TRAINING DIFFERENCE (VOLS vs. NON-VOLS)	55	1.99	.02++
2) POST-TRAINING DIFFERENCE (VOLS vs. NON-VOLS)	55	1.14	.13
3) CHANGE IN VOLUNTEERS (PRE- vs. POST-TRAINING)	55	1.40	.08+
4) CHANGE IN NON-VOLUNTEERS (PRE- vs. POST-TRAINING)	55	0.27	.39

*THE VALUE OF 'Z' RESULTING FROM THE MANN-WHITNEY U TEST

**ALL SIGNIFICANCE LEVELS ARE 'ONE-TAILED'

+SIGNIFICANT AT THE .1 LEVEL

++SIGNIFICANT AT THE .05 LEVEL

(b) Post-training there would be no difference in injury accident frequency between the groups.

(c) The injury accident frequency of the volunteers would be lower post-training than pre-training.

(d) There would be no change in the injury accident frequency of the non-volunteers.

ILLUSTRATION OF THE INJURY ACCIDENT DATA

Figures 9 to 14 illustrate the results in histogram form. This form of presentation is the most useful as it allows the control results (either non-volunteer, or pre-training injury accident frequencies), to be subtracted from the experimental group's results (either the volunteer or post-training injury accident frequencies). Consequently any column rising above the 'x' axis indicates more injury accidents occurring in the experimental group at that frequency and any column falling below the 'x' axis indicates that less experimental subjects than control subjects had that number of accidents. The histograms allow a comparison to be made between Factories B and C (Figures 9 to 12). No other form of illustration could achieve this as at Factory B there was a tendency for the injury accident frequency of both groups (trained and untrained) to increase and at Factory C there was a tendency for the injury accident frequency of both groups to fall. The area of the columns below the 'x' axis had to equal that of the columns above the 'x' axis. As a result this form of presentation clearly shows both how the two groups differ and also the frequencies at which the differences occur or the direction of change (i.e. improvement or worsening in the injury accident frequency) where pre- to post-training performances are illustrated.

For the purposes of illustration the histograms have been simplified by combining accident frequencies. At Factory B the following combinations were made; 0 and 1 accident, 2 and 3 accidents, 4 and 5 accidents, and 6 to 16 accidents. At Factory C, where relatively less injury accidents occurred, the combinations were as follows: 0 and 1 accident, 2 and 3 accidents, and 4 to 7 accidents. To help a visual comparison of the results at the two factories, the scales used on the graphs for each factory are different.

Figures 9 and 10 show the pre-training and post-training differences between the two groups at each factory. Figures 11 and 12 show the changes in the injury accident frequency between the pre-training and post-training comparison periods for the volunteers and non-volunteers separately, for each factory. Figure 13 shows the change in the volunteers' distribution of injury accidents pre- to post-training (X) and the same for the non-volunteers (Y), at Factory B. Figure 14 illustrates the same information for Factory C. Where the change in the non-volunteers' distribution of injury accidents (Y) is used as a baseline measure, it is possible to indicate the change in the volunteers' injury accident frequency relative to that of the non-volunteers by subtracting the non-volunteers' change (Y) from that of the volunteers' (X). Histogram (Z) on Figures 13 and 14 shows the result of this subtraction.

Figure 9

Reference to Figure 9 shows that at both factories more volunteers than non-volunteers had 2 or more injury accidents and that less had 0 or 1 injury accident than non-volunteers prior to training. This difference was significant at the .1 level at Factory B and the .05 level at Factory C.

Figure 10

Figure 10 shows a similar trend at the two factories. The trained group's injury accident frequency was greater than that of the untrained group, but the difference was not marked and did not reach significance at the .1 level at either factory. Comparison with Figure 9 clearly shows the reduced effect.

Figure 11

Figure 11 indicates that at both factories there was an improvement in the injury accident frequency of the trained group. There is a similar pattern for each factory although it is more marked at Factory C. The improvement at Factory B did not reach statistical significance but that at Factory C was significant at the .1 level. This finding gives the strongest support to the major research hypothesis that first aid training (combined with first aid propaganda) reduces people's injury accident rate.

Figure 12

Figure 12 illustrates the same analysis as Figure 11 for the untrained matched group. On this graph the changes at the two factories are less similar. At Factory C there was a movement from 2 and 3 accidents towards 0 and 1 accident again indicating a reduction in injury accident frequency, although this improvement did not reach statistical significance. At Factory B there was a tendency for the injury accident frequency to increase although this did not reach significance at the .1 level.

Figure 13

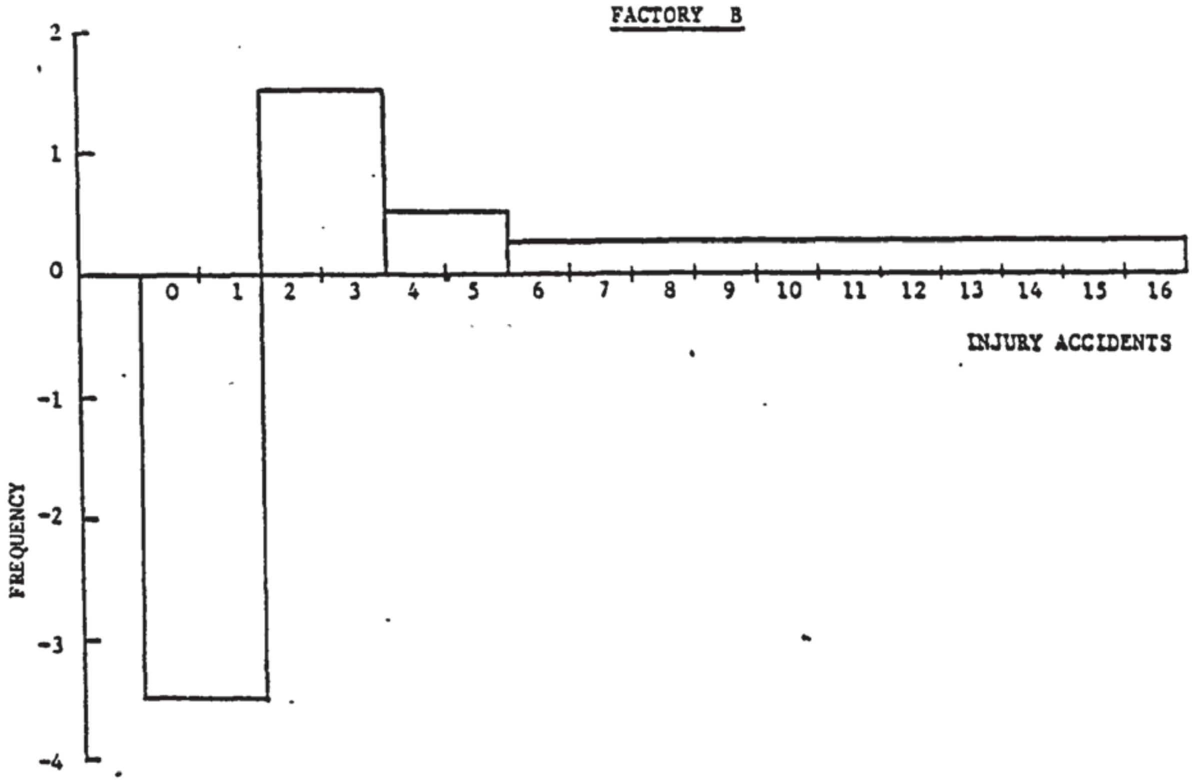
Figure 13 shows that at Factory B there was a slight improvement in the volunteers' injury accident frequency (X), and a deterioration in that of the non-volunteers (Y). Neither of these changes reached statistical significance. Histogram (Z) illustrates the effect of subtracting (Y) from (X). This histogram indicates that there was an improvement in the trained group's injury accident frequency, relative to the change in that of the non-volunteers (the baseline measure), from the pre- to the post-training comparison period. Histogram (Z) shows that there were relatively more volunteers suffering 0 or 1 injury accident and relatively less suffering from 2 to 16 injury accidents.

Figure 14

Figure 14 shows a similar analysis as Figure 13 for Factory C. It indicates that both the trained and untrained groups had an improved injury accident frequency, but that this improvement was greater for the trained group. Histogram (Z) illustrates this greater improvement. It shows that relatively more volunteers suffered 0 or 1 injury accident and relatively less suffered from 4 to 7 injury accidents.

SUMMARY OF THE INJURY ACCIDENT DATA

All the trends in injury accident data illustrated in Figure 9 to 14 support the major hypothesis, that training in first aid reduces people's injury accident rate. These trends were more marked at Factory C where the trained group experienced a significantly lower injury accident frequency following their first aid training.



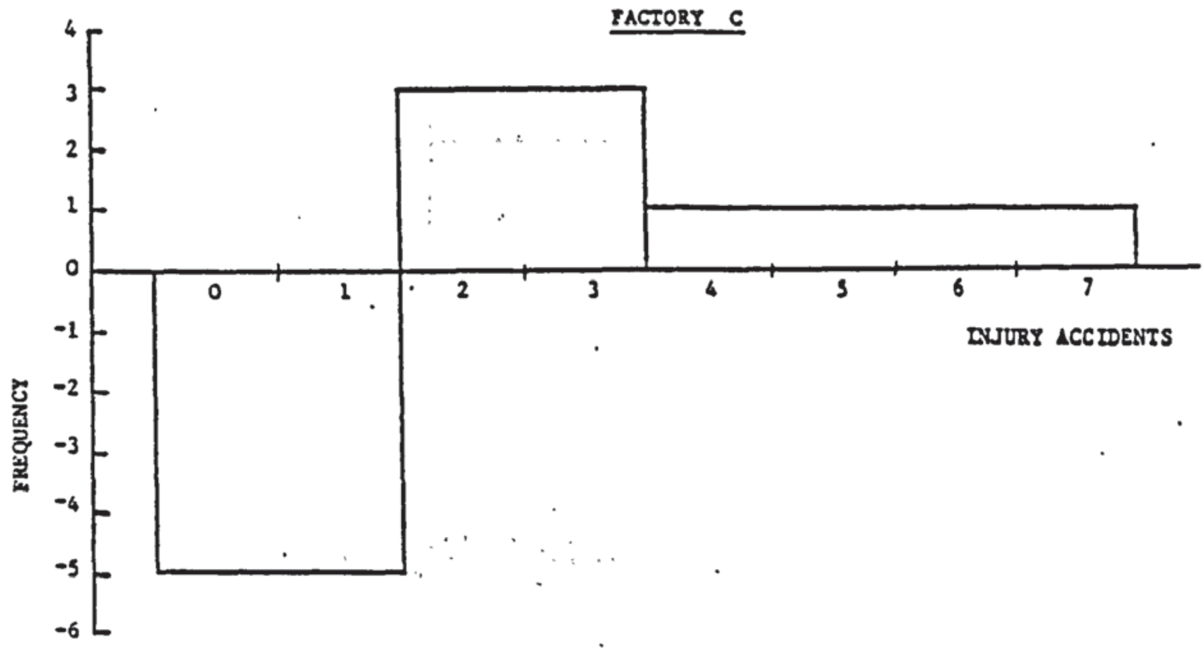
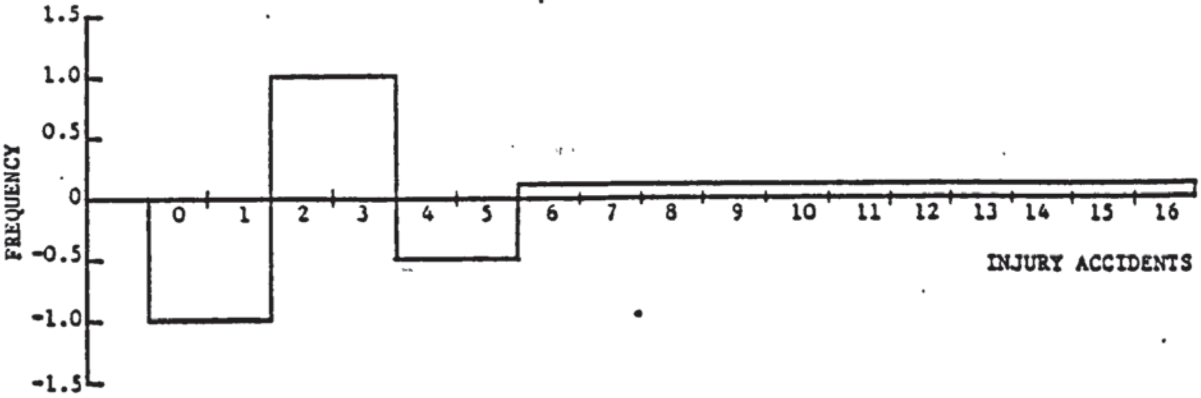


FIGURE 9

HISTOGRAMS ILLUSTRATING PRE-TRAINING DIFFERENCES IN INJURY ACCIDENT FREQUENCY (VOLUNTEERS — NON-VOLUNTEERS)

FACTORY B



FACTORY C

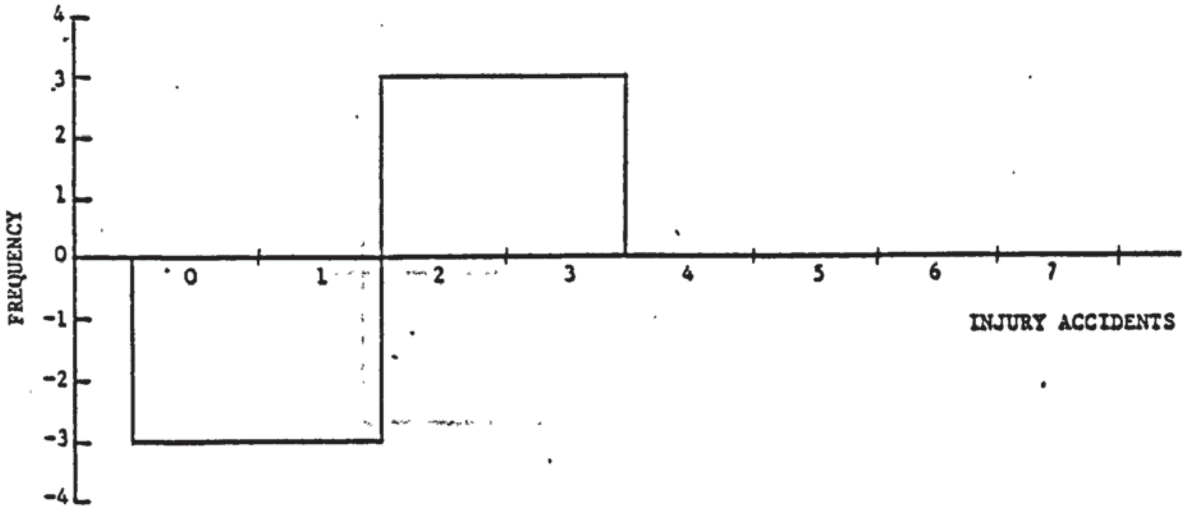
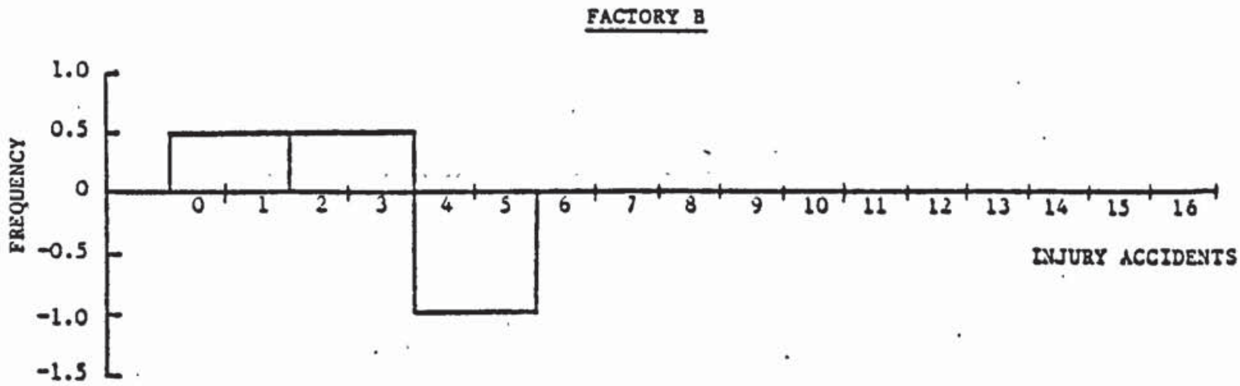


FIGURE 10

HISTOGRAMS ILLUSTRATING POST-TRAINING DIFFERENCES IN INJURY ACCIDENT FREQUENCY (VOLUNTEERS — NON-VOLUNTEERS)



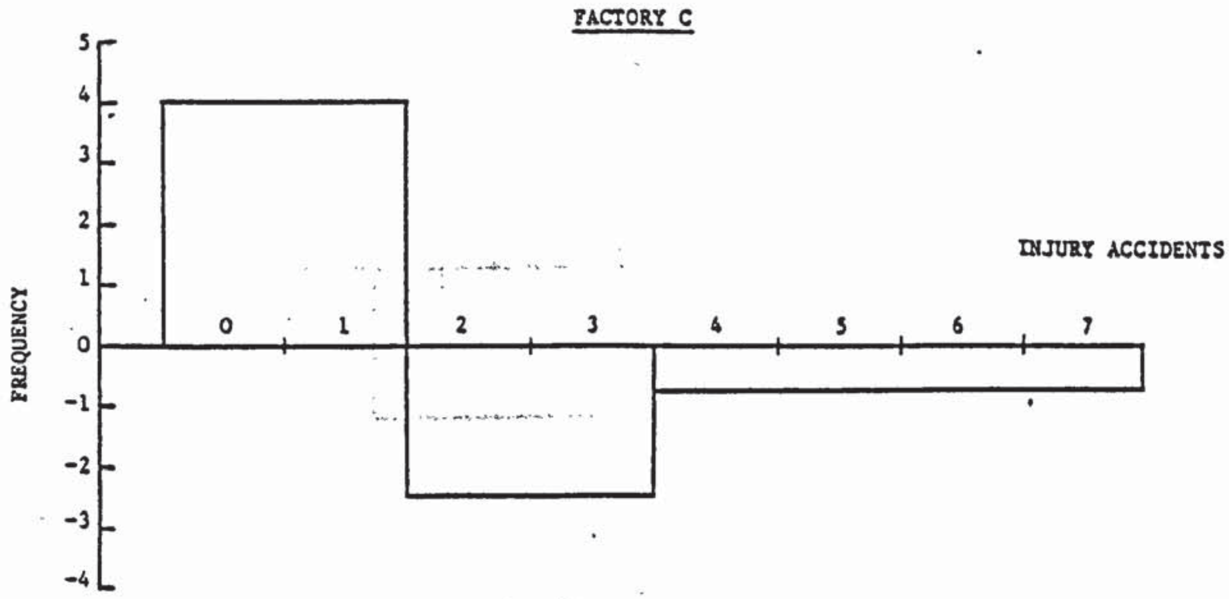
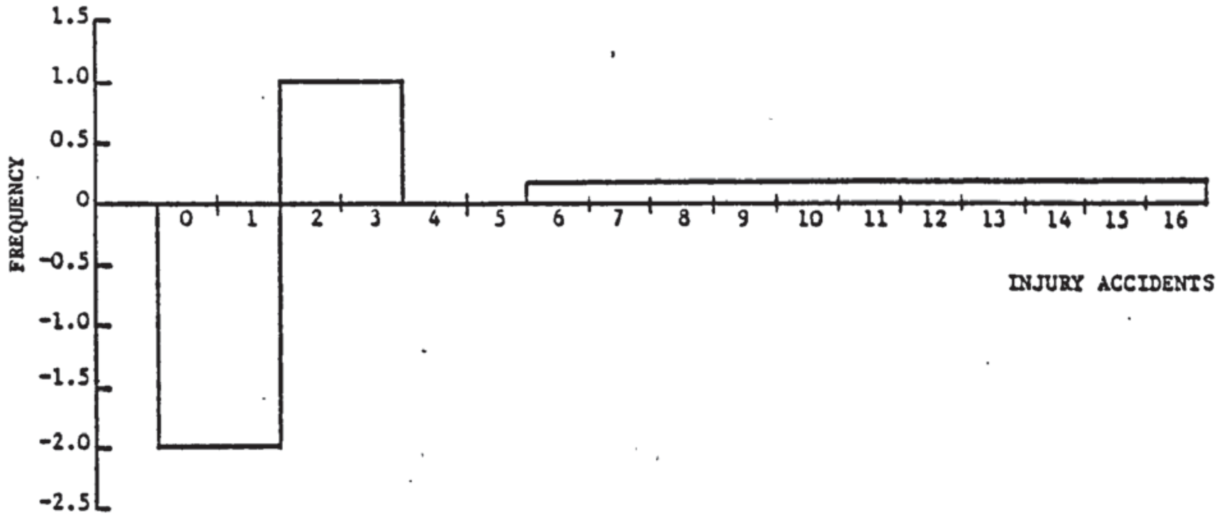


FIGURE 11

HISTOGRAMS ILLUSTRATING THE CHANGE IN INJURY ACCIDENT FREQUENCY OF THE VOLUNTEERS (POST-TRAINING — PRE-TRAINING)

FACTORY B



FACTORY C

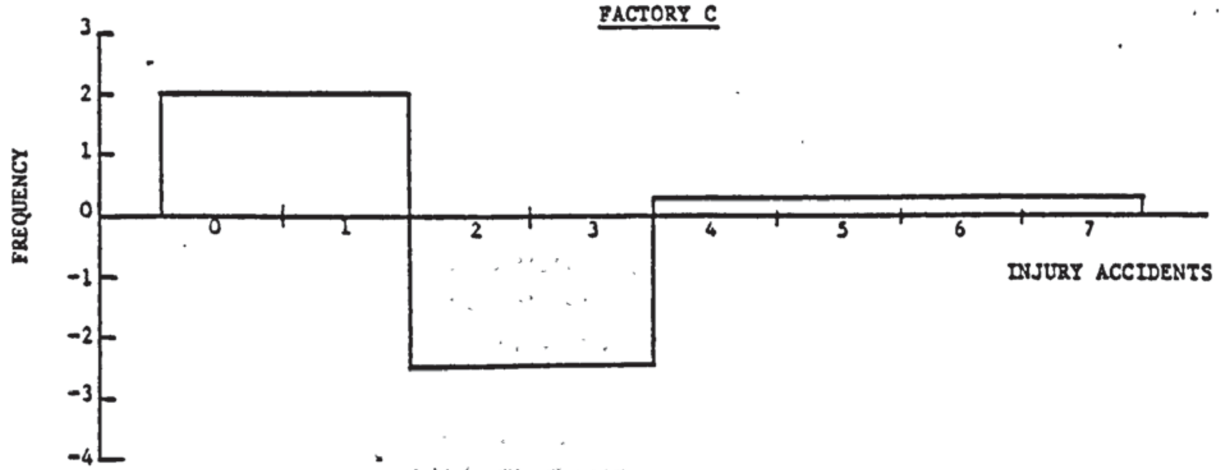


FIGURE 12

HISTOGRAMS ILLUSTRATING THE CHANGE IN INJURY ACCIDENT FREQUENCY OF THE NON-VOLUNTEERS (POST-TRAINING — PRE-TRAINING)

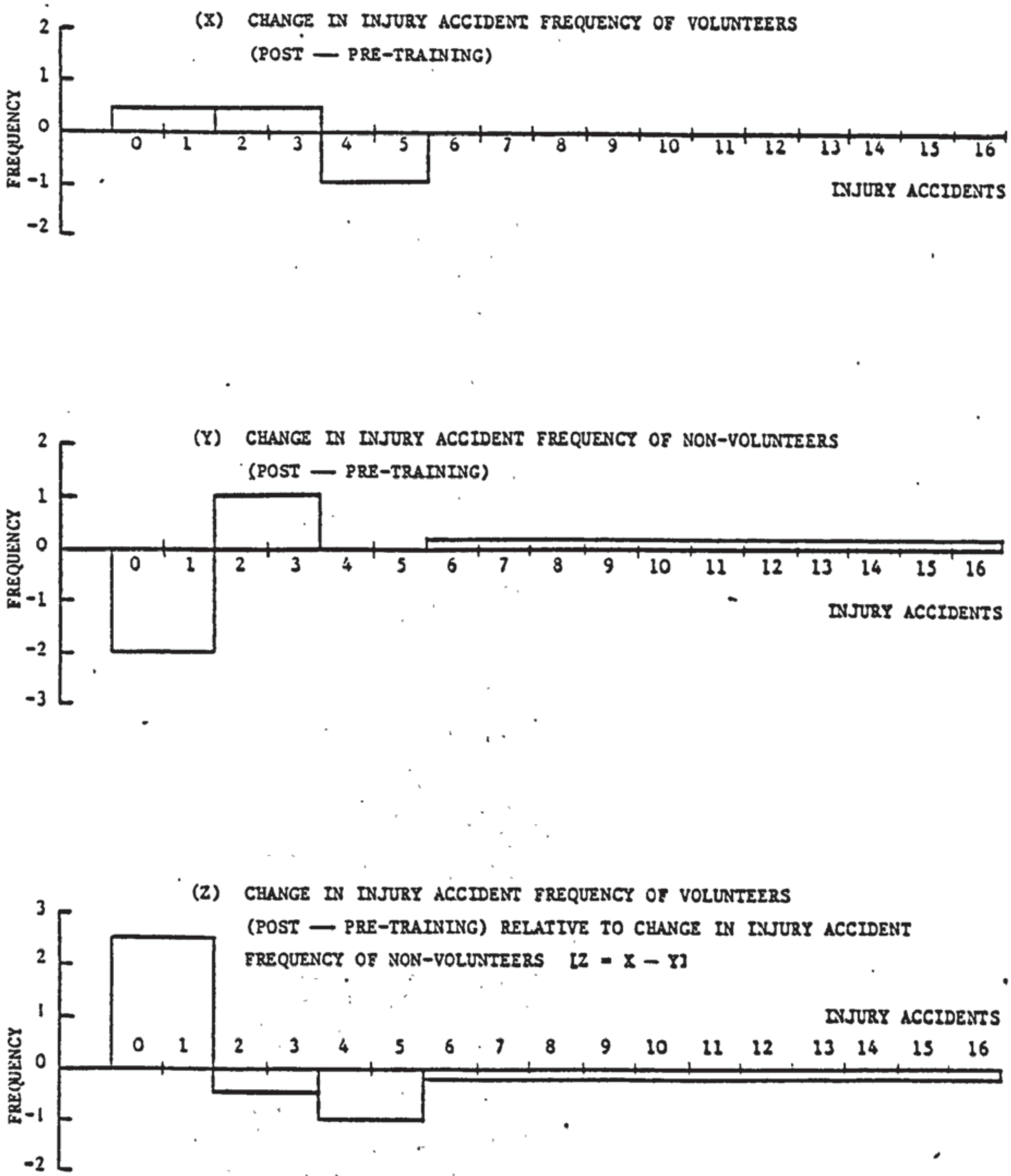


FIGURE 13

HISTOGRAMS ILLUSTRATING THE CHANGE IN INJURY ACCIDENT FREQUENCY OF VOLUNTEERS RELATIVE TO NON-VOLUNTEERS AT FACTORY B

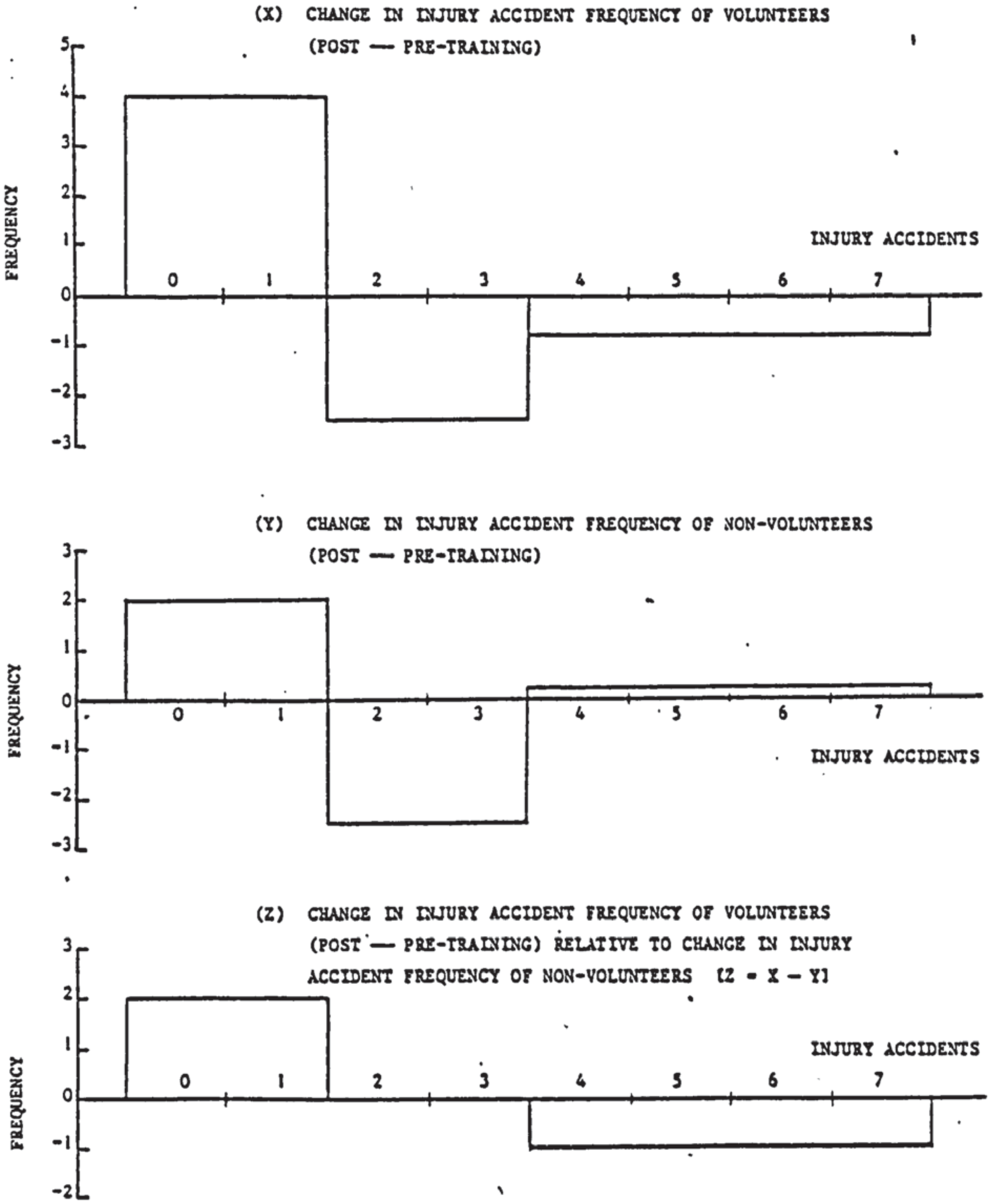


FIGURE 14

HISTOGRAMS ILLUSTRATING THE CHANGE IN INJURY ACCIDENT FREQUENCY OF VOLUNTEERS RELATIVE TO NON-VOLUNTEERS AT FACTORY C

INTERVIEW DATA

The raw responses to the interviews are shown in Appendix 21. The results of the statistical tests carried out on these data are shown in Table 14.

Statistical Tests

Most of the interview data were categorical. These data were tested using a χ^2 test or a Fisher Exact Probability test. Where respondents were required to mark subjective response scales and on the questions asking about the worst types of injury and the worst parts of the body to injure the data were analysed by t-tests. In all cases the null hypothesis was that there was no difference between the responses of the subjects in each group.

A significance level of $\alpha = .1$ was adopted, for the reasons outlined above.

TABLE 14

In Table 14 the question numbers refer to the pre-training and post-training interview schedules shown in Appendices 18 and 19. The prefix PRE indicates that the question number refers to the pre-training interview schedule. The prefix POST indicates that the question number refers to the post-training interview schedule. Where the result of the statistical analysis was significant, the value of α is entered in the table and the statistical test used is indicated. χ^2 is indicated by 'X^2', the Fisher Exact Probability Test by 'FISHER', and t-tests by 't-test'.

For each factory up to four different tests were carried out on each part question. The column headed 'PRE TR' refers to the comparison of the volunteers' and non-volunteers' responses on the pre-training interview. The column labelled 'POST TR' refers to the comparison of the volunteers' and non-volunteers' responses on the post-training interview. The column headed 'VOLS' indicates the result of the comparison of the volunteers' responses, pre- and post-training. The column headed 'NON' refers to the comparison of the non-volunteers responses, pre-training and post-training. Certain questions were asked pre-training, post-training or at one factory only. This is reflected in the column entries. The figures in the columns indicate the level of significance achieved by the test. Where 'n' is inserted, $\alpha > .1$.

No attempt is made to indicate the direction of the significant differences in Table 14. Tables 15 and 16 in the following chapter summarise such differences in direction.

Questions are grouped under the area they investigated. For example, under 'Awareness of danger/risk-taking', all tests in the VOLS column were non-significant indicating that there was no measured change in the trainees' awareness of danger and risk-taking between pre- and post-training.

TABLE 14

STATISTICAL SIGNIFICANCE OF THE DIFFERENCES IN VOLUNTEERS' AND NON-VOLUNTEERS' RESPONSES TO THE INTERVIEW PRE- AND POST-TRAINING AND CHANGES IN RESPONSE OF THE TWO GROUPS PRE- TO POST-TRAINING

SUBJECT AREA, QUESTION NO., AND WHERE RESULT IS SIGNIFICANT, STATISTICAL TEST USED	FACTORY B				FACTORY C			
	PRE TR	POST TR	VOLS	NON	PRE TR	POST TR	VOLS	NON
VOLUNTEERS EXPECTATIONS OF THE COURSE AND HOW FAR THEY WERE CONFIRMED								
PRE 3(b) POST 6(a)			n				n	
PRE 3(c) POST 6(b) (X^2)			.1				n	
PRE 4(a) POST 7(a)			n				n	
PRE 4(b) POST 7(b) (X^2)			.1					
PRE 6 POST 8(a)			n				n	
HISTORY OF FIRST AID TRAINING AND TREATMENTS								
PRE 1(a)	n				n			
CERT./LITTLE	n				n			
PRE 1(b)	n				n			
PRE 1(c)	n				n			
PRE 1(d)	n				n			
PRE 1(a)+(e) (X^2)	.05				n			
PRE 7(a) (b) (c)	n				n			
PRE 8(a)	n				n			
POST 16(a) (FISHER)		.06				.09		

TABLE 14 CONTINUED

SUBJECT AREA, QUESTION NO., AND WHERE RESULT IS SIGNIFICANT, STATISTICAL TEST USED	FACTORY B				FACTORY C			
	PRE TR	POST TR	VOLS	NON	PRE TR	POST TR	VOLS	NON
KNOWLEDGE OF FIRST AID								
PRE 30 POST 36 (X^2) (Whether minor, serious or most important treatments)	n	.05	n	n	n	n	n	n
(Whether or not treatments mentioned were on course)	n	n	n	n	n	.001	.001	n
ATTITUDE TO FIRST AID								
PRE 5 POST 14 (t-test)	n	.1	.005	n	n	.005	.005	n
POST 13 (t-test)		n				.025		
POST 15(a) (X^2)		.05				n		
POST 15(d) (FISHER/X^2)		.001				.1		
PRE 9 POST 17 (X^2)	n	.1	.05	n	n	.001	n	.01
AWARENESS OF DANGER/ RISK-TAKING								
PRE 11 (f)	n				n			
PRE 16 POST 24 (t-test)	.1	n	n	n	n	n	n	n
PRE 18(b) POST 26(b) (X^2)	.1	n	n	n	n	n	n	n
PRE 20(a) POST 27(a) (t-test)	n	.1	n	.025	n	n	n	n
PRE 21(a) POST 28(a) (t-test)	n	n	n	.1	n	n	n	n
PRE 24(a) POST 31(a) (X^2)	n	n	n	n	.05	.1	n	n
PRE 24(b) POST 31(b) (X^2)	.1	n	n	n	n	n	n	n

TABLE 14 CONTINUED

SUBJECT AREA, QUESTION NO., AND WHERE RESULT IS SIGNIFICANT, STATISTICAL TEST USED	FACTORY B				FACTORY C			
	PRE TR	POST TR	VOLS	NON	PRE TR	POST TR	VOLS	NON
Awareness of Danger/ Risk-Taking (continued)								
PRE 25 POST 32 (t-test) (Number marked)	.05	.05	n	n	n	n	n	n
PRE 26(g)	n				n			
PRE 27(a) POST 33(a) (X^2)	n	n	n	n	n	.025	n	.025
PRE 27(b) POST 33(b) (FISHER)	n	n	n	n	.075	n	n	n
PRE 27(c) POST 33(c)	n	n	n	n	n	n	n	n
RESPONSIBILITY TO ACT								
PRE 11(e)	n				n			
PRE 17(c) POST 25(c) (X^2)	n	n	n	.1	n	n	n	n
PRE 20(c) POST 27(c)	n	n	n	n	n	n	n	n
PRE 20(d) POST 27(d) (X^2)	n	.05	.01	n	.05	n	n	n
PRE 21(d) POST 28(d)	n	n	n	n	n	n	n	n
PRE 21(e) POST 28(e)	n	n	n	n	n	n	n	n
PRE 22(a) POST 29(a) (t-test)	.1	.05	.025	.1	n	n	n	n
PRE 22(b) POST 29(b) (X^2)	n	n	n	n	n	n	.1	n
PRE 23(b) POST 30(b) (X^2)	n	.05	.1	n	n	n	n	n

TABLE 14 CONTINUED

SUBJECT AREA, QUESTION NO., AND WHERE RESULT IS SIGNIFICANT, STATISTICAL TEST USED	FACTORY B				FACTORY C			
	PRE TR	POST TR	VOLS	NON	PRE TR	POST TR	VOLS	NON
Responsibility to Act (continued)								
PRE 25 POST 32 (Actual items marked)	n	n	n	n	n	n	n	n
PRE 26(d) (X^2)	.1				n			
PRE 26(e)	n				n			
PRE 27(d) POST 33(d) (X^2)	n	n	.1	n	n	n	n	n
AWARENESS OF SAFE BEHAVIOUR								
PRE 26(f)	n				n			
DECISION TO ADOPT SAFE BEHAVIOUR								
PRE 8(c)	n				n			
PRE 10(d)	n				n			
PRE 8(c) + 10(d) (X^2) (Combining factories)	-	-	-	-	.05	-	-	-
PRE 11(g)	n				n			
PRE 14(a) POST 22(a)	n	n	n	n	n	n	n	n
PRE 14(b) POST 22(b) (X^2)	n	n	n	n	n	n	.025	.1
PRE 15(a) POST 23(a) (t-test)	n	n	.1	n	n	n	n	n
PRE 15(b) POST 23(b) (X^2)	n	n	n	.1	n	n	n	n

TABLE 14 CONTINUED

SUBJECT AREA, QUESTION NO., AND WHERE RESULT IS SIGNIFICANT, STATISTICAL TEST USED	FACTORY B				FACTORY C			
	PRE TR	POST TR	VOLS	NON	PRE TR	POST TR	VOLS	NON
Decision to Adopt Safe Behaviour (continued)								
PRE 17(b) POST 25(b)	n	n	n	n	n	n	n	n
PRE 17(f) POST 25(f)	n	n	n	n	n	n	n	n
PRE 17(g) POST 25(g) (Why not prefer)	n	n	n	n	n	n	n	n
(Why don't you) (X^2)	n	.025	n	n				
PRE 18(c) POST 26(c) (X^2)	n	n	n	n	.05	n	n	n
PRE 18(d) POST 26(d)	n	n	n	n	n	n	n	n
PRE 19(b)	n				n			
PRE 24(d+g) POST 31 (d+ g)	n	n	n	n	n	n	n	n
PRE 29(a) POST 35(a)	n	n	n	n	n	n	n	n
PRE 29(b) POST 35(b) (X^2)	n	n	n	n	n	.1	n	n
PRE 29(c) POST 35(c)	n	n	n	n	n	n	n	n
REPORTED ACTION								
PRE 17(d) POST 25(d) (FISHER)	n	n	n	n	n	n	.09	n
PRE 19(a)	n				n			
PRE 24(c+e) POST 31 (c+e)	n	n	n	n	n	n	n	n

TABLE 14 CONTINUED

SUBJECT AREA, QUESTION NO., AND WHERE RESULT IS SIGNIFICANT, STATISTICAL TEST USED	FACTORY B				FACTORY C			
	PRE TR	POST TR	VOLS	NON	PRE TR	POST TR	VOLS	NON
CLAIMED INJURY ACCIDENT INVOLVEMENT AND EXPERIENCE								
PRE 10(a) POST 18(a)	n	n			n	n		
PRE 10(a)+(b)	n				n			
PRE 11(a)+(b)	n				n			
PRE 21(b) POST 28(b) (t-test)	n	n	n	n	.1	.1	n	n
CLAIMED WILLINGNESS TO REPORT MINOR INJURIES								
PRE 12 POST 20 (t-test)	n	.025	.025	n	n	.05	.1	n
PRE 28(a) POST 34(a)	n	n	n	n	n	n	n	n
PRE 28(b) POST 34(b) (X^2)	n	.1	n	n	n	n	n	n
SPECIFIC INFORMATION								
PRE 31(b)	n				n			
PRE 31(c) (X^2)	.001				.01			
PRE 31(d) COLOURS (X^2)	.05				n			
WORDING (t-test)	.005				.025			
POST 37(a) WHETHER EXAMPLE WAS ON OBJECTIVE CARDS		n						
POST 37(b) WHETHER EXAMPLE WAS ON OBJECTIVE CARDS		n						
POST 37(c) WHETHER EXAMPLE WAS ON OBJECTIVE CARDS		n						

TABLE 14 CONTINUED

SUBJECT AREA, QUESTION NO., AND WHERE RESULT IS SIGNIFICANT, STATISTICAL TEST USED	FACTORY B				FACTORY C			
	PRE TR	POST TR	VOLS	NON	PRE TR	POST TR	VOLS	NON
Specific Information (continued)								
POST 37(d) WHETHER EXAMPLE WAS ON OBJECTIVE CARDS		n						
POST 37(a) INDUSTRIAL/NON INDUSTRIAL EXAMPLES GIVEN (X^2)		.1				n		
POST 37(b) INDUSTRIAL/NON INDUSTRIAL EXAMPLES GIVEN (X^2)		n				.01		
POST 37(c) INDUSTRIAL/NON INDUSTRIAL EXAMPLES GIVEN (X^2)		n				.05		
POST 37(d) INDUSTRIAL/NON INDUSTRIAL EXAMPLES GIVEN (X^2)		n				.1		
POST 37 (a+b+c+d) INDUSTRIAL/NON INDUSTRIAL EXAMPLES GIVEN (X^2)		n				.001		
FACTORY C ONLY								
POST 38(a)						n		
POST 38(b) WHETHER KNEW CORRECT NUMBER						n		
POST 38(c) NUMBER OF COLOURS RECALLED						n		
POST 38(d) NUMBER WITH DRAWINGS ON RECALLED						n		
POST 38(e) WHETHER COULD RECALL DRAWINGS						n		
POST 38(f) WORDING RECALLED						n		

CHAPTER 19

DISCUSSION OF RESULTS FROM FACTORIES B AND C

DISCUSSION OF RESULTS FROM FACTORIES B AND C

SUMMARY

This chapter discusses the findings from the two major factory studies carried out at factories B and C. The results are discussed in relation to the major hypothesis that: training in first aid reduces people's injury accident rate.

Analysis of the injury accident data showed that pre-training at both factories the volunteers for training reported more injury accidents than the non-volunteers. Post-training at both factories there was no difference between the groups in the number of injury accidents they reported. It is argued that the above change resulted from a reduction in injury accidents reported by trainees between pre-training and post-training periods. Interview evidence showed that trainees became more willing to report their minor injuries following their training.

The interview data was subjected to two main analyses and the discussion is based on these. Firstly, the pre-training differences in response between the volunteers and non-volunteers are discussed. Secondly, changes in responses between the pre-training interviews and the post-training interviews are discussed.

Pre-training there appeared to be little difference between the groups in their history of first aid training, the number of treatments they had carried out, and their knowledge of first aid. Most findings indicated that there was no (pre-training) difference between the groups in their acceptance of their responsibility to act in order to avoid injury. There was little evidence to indicate that the volunteers for

training were more motivated to adopt safe behaviour than the non-volunteers were. There was no evidence to suggest that either group were more willing either to undertake dangerous activities or to take any necessary action to avoid danger. However, there was some evidence, particularly at Factory B, to show that the volunteers for training were already more aware of danger and risk-taking than were the non-volunteers.

The changes in responses between pre-training interviews and post-training interviews are discussed in relation to five hypotheses derived from the discussion of the processes involved in accident causation (Chapter 3). These hypotheses were:

A. First aid trained respondents will have an increased knowledge of first aid and will be more positively motivated towards first aid than they were prior to training.

B People trained in first aid will become more aware of danger and risk-taking than they were prior to training.

C People trained in first aid will rate themselves more responsible for safety and accident prevention than prior to training.

D First aid trained employees will become more aware of safe behaviour than they were pre-training, and consequently the safe behaviour will be 'available' to them when it is required.

E People trained in first aid will become more likely to adopt safe behaviour than they were prior to training.

There was clear evidence from both factories to support Hypothesis A. Little evidence supported Hypothesis B. There was evidence, particularly at Factory B, that the trainees became more aware of their responsibility for preventing accidents (Hypothesis C). There was some evidence to support hypotheses D and E but in these cases the evidence did not provide consistent support.

Responses to questions on trainees' first aid training indicated that they were generally satisfied with it and that they had been motivated to learn more, or at least to keep their first aid knowledge up to date. Trainees were not surprised by the content of the first aid training or by the effect it had on them. There were indications from the interviews that the presentation of the training at Factory C was better than at Factory B.

INJURY ACCIDENT DATA

The major hypothesis was that; training in first aid reduces people's injury accident rate. Therefore, the strongest confirmation of the hypothesis would be a significant reduction in the number of injury accidents suffered by the volunteers following their first aid training.

The design of the project allowed four relevant experimental comparisons to be made:

(1) Pre-training injury accident involvement of the volunteers and the non-volunteers. One of the criticisms of the FACTS I study was that people who were first aid trained may have been safer than untrained people before their training (see Chapter 2). The results from the present

study suggest that this criticism does not hold in factories B and C. In fact the volunteers for training at both factories had a worse reported injury accident record prior to training than did the non-volunteers over the same period of time. It is possible that this difference resulted from the volunteers reporting more of their injuries for treatment than the non-volunteers did. This difference could have been the result of awareness of the possible consequences of untreated injuries. Apart from this there was no reason to suspect that the volunteers had not in fact suffered more injuries than the non-volunteers. Claimed willingness to report minor injuries is discussed below.

(2) Post-training injury accident involvement of the volunteers and the non-volunteers. At both factories, there was no significant difference in reported injury accident rate between the two groups following the first aid training although at both factories the injury accident rate of the trained group remained slighly worse than that of the untrained group over the post-training comparison period.

(3) Change in the injury accident involvement of the volunteers between pre- and post-training. At Factory B there was a small - statistically insignificant - improvement (i.e. fewer injury accidents were reported) in the reported injury accident involvement of the volunteers following their first aid training. At Factory C the improvement in the reported injury accident rate was statistically significant ($\alpha < .1$) and provided the strongest support for the major hypothesis.

(4) Change in injury accident involvement of the non-volunteers from pre- to post-training. This was the control measure with which the change in the volunteers' injury accident involvement was compared. At Factory C there was a slight - statistically non-significant - improvement in the reported injury accident rate of the non-volunteers between the pre- and post-training comparison periods. At Factory B there was a larger - though still statistically non-significant - deterioration (i.e. they reported more injury accidents) in the reported injury accident involvement of the untrained group.

Figures 13 and 14 (Chapter 18) indicate the changes in the reported injury accident involvement of the trainees at each factory using the change in the non-trained subjects' injury accident involvement as a baseline measure. A similar change was found at each factory, which indicated that the first aid training at both factories led to a relative improvement in the reported injury accident involvement of the volunteers following their training. Improvement was more marked in the volunteers at Factory C. Thus the results of the injury accident data analysis at both factories support the major hypothesis.

WILLINGNESS TO REPORT INJURY ACCIDENTS

A serious shortcoming in the use of injury accident data is that data can be affected by the willingness of workers to report their injury accidents. As was shown in Chapter 5 it can not be assumed that the reporting level will remain constant, particularly when safety measures and in this case both interviewing and first aid training intervene.

Questions were included in the interview schedule used at factories B and C to measure willingness to report minor injury accidents. (It was assumed that all serious injury accidents would be reported). Respondents were shown a list of minor injuries and asked to indicate those which would not precipitate a visit to the surgery. The number of minor injuries marked by respondents was used as a measure of their general willingness to report such injury accidents. In the pre-training interviews there was no statistically significant difference between the mean number of injuries marked by each group. In the post-training interviews, at both factories, the trainees marked significantly fewer items (i.e. they indicated that they would attend the surgery with more of the listed injuries) than both the non-volunteers and than they themselves had marked pre-training. This finding suggests that following training the volunteers had an increased willingness to report their injury accidents, and consequently the improvement in the measured injury accident involvement of the trainees may have been an underestimate.

Respondents were asked later in the interview whether they thought it was important to report their injury accidents. In both the pre- and post-training interviews virtually all respondents claimed that this was important. When respondents at Factory B were asked why it was important to report minor injuries, following training, volunteers responded relatively more often than they had done pre-training with reasons to do with future compensation cases and less often than pre-training with reasons to do with the benefits of immediate first aid care. This was an unexpected finding and one which is difficult to explain, except by reference to factors unconnected with the research.

REPORTED EXPERIENCE OF INJURY ACCIDENTS

One question in the interview schedule asked about involvement in accidents leading to minor injury. Respondents were asked to indicate on a scale how often they had minor injuries. Little difference was found between pre- and post-training responses at Factory B. At Factory C the volunteers claimed, both pre- and post-training, to have more minor injuries than did non-volunteers. This finding was supported by the injury accident data over the two periods.

INTERVIEW DATA

As stated in Chapter 5, interview data were necessary to investigate the mechanisms through which first aid training could affect injury accident rate. It has been shown above that the first aid training at Factories B and C did produce an improvement in the reported injury accident rate of the volunteers compared with that of the matched group of non-volunteers. It was hoped that the changes in pre- and post-training responses on the interviews would help to explain how the relative improvements in injury accident rate.

The pre-training interviews had a second purpose. Control subjects had been selected on the criterion of exposure to risk. It was not possible to match for prior first aid training (as this information was not available). It was argued earlier that people who volunteered for first aid training were likely to be more safety motivated than people who did not volunteer for training. This assumption was found to be untenable later in the research. However, the pre-training interviews were intended to test differences between the volunteers and non-volunteers on: prior first aid training, awareness of danger, awareness of risk-taking, perceived responsibility for safety and accident prevention, willingness to adopt safe behaviour, and the behaviour they claimed to adopt to avoid danger. The differences found between the groups are discussed below.

PRE-TRAINING DIFFERENCES IN INTERVIEW RESPONSES BETWEEN VOLUNTEERS AND NON-VOLUNTEERS

Results from the injury accident data analysis indicated that, prior to training at both factories, the volunteers for first aid training had significantly worse injury accident rates than did the matched control groups.

Despite this, the results in this section are discussed in relation to the null hypothesis (i.e. that there were no differences between the two groups). The two alternative hypotheses (that the volunteers were safer than the non-volunteers or that the non-volunteers were safer than the volunteers) are discussed at the end of the section.

Table 15 summarises the pre-training differences in interview responses between the volunteers and the non-volunteers. The table indicates where significant differences were found between the responses of the two groups to the pre-training interview schedule. The table shows the question topic with a tick in one of the following columns:

(1) NO DIF. This column indicates that there was no significant difference between the responses of the two groups at either factory.

(2) SIG DIF. This column indicates that there was a significant difference between the responses of the two groups (in the same direction) at both factories, or that there was a significant difference between the responses of the two groups at one factory, supported by a non-significant trend (in the same direction) at the other factory.

(3) B ONLY. A tick in this column indicates that there was a significant difference between the responses of the two groups at Factory B only, which was not supported by a similar trend at Factory C.

(4) C ONLY. A tick in this column indicates the same as in (3) above with the significant difference occurring at Factory C only, not supported by a difference in the responses at Factory B.

TABLE 15

SUMMARY TABLE OF THE PRE-TRAINING DIFFERENCES BETWEEN VOLUNTEERS AND NON-VOLUNTEERS

TOPIC	NO DIF	SIG DIF	B ONLY	C ONLY
A. HISTORY, PRACTICE AND KNOWLEDGE OF AND ATTITUDE TOWARDS FIRST AID				
Number of respondents previously trained in first aid	√			
Number of respondents who had carried out first aid treatments	√			
Self-rated ability to perform first aid	√			
Awareness of the most important first aid treatments	√			
Number believing everyone should know first aid	√			
Number of serious injuries seen	√			
Number of respondents affected by sight of blood or injury		√		
B. AWARENESS OF DANGER/RISK-TAKING				
Predictability of experienced serious injury	√			
Rated danger of own job			√	
Why other industries rated dangerous			√	
Rated likelihood of serious injury at work	√			
Rated likelihood of minor injury at work	√			
Whether they see other workers taking risks				√
What risks they see other workers taking			√	
Number of causes of accidents rated as important			√	
Predictability of most recent injury at work	√			
Whether they can predict when an accident is likely to happen to themselves	√			
How they can predict when an accident is likely to happen to themselves				√
Whether they can predict when an accident is likely to happen to somebody else	√			

TABLE 15 CONTINUED

TOPIC	NO DIF	SIG DIF	B ONLY	C ONLY
C. RESPONSIBILITY TO ACT				
How their serious injuries could have been prevented	√			
What they think is necessary to avoid danger in their job	√			
Why they think serious injuries occur	√			
How the serious injuries could be prevented				√
Why they think minor injuries occur	√			
How they think the minor injuries could be prevented	√			
Rated number of accidents that could be reduced			√	
How they think the number of accidents in the factory could be reduced	√			
Why they think they themselves could do most to reduce the number of accidents	√			
Which they think are the most important causes of accidents	√			
Why they think they were injured at work			√	
Whether they think their injury could have been prevented	√			
How they can tell when an accident will happen to somebody else	√			
D. AWARENESS OF SAFE BEHAVIOUR (AND ITS AVAILABILITY)				
How their latest injury at work could have been prevented	√			

TABLE 15 CONTINUED

TOPIC	NO DIF	SIG DIF	B ONLY	C ONLY
E. DECISION TO ADOPT SAFE BEHAVIOUR				
What effect other than physical, serious injury had on them	✓			
Rated worst types of injury	✓			
Why that type of injury selected	✓			
Rated worst area of body to injure	✓			
Why that area of body selected	✓			
Whether the danger in their job worries them	✓			
Whether they would prefer a safer job	✓			
Why they wouldn't prefer or don't get a safer job	✓			
Whether they would work in another dangerous industry				✓
Reasons given for unwillingness to work in another dangerous industry	✓			
How they feel while undertaking dangerous activities outside work	✓			
Why they take risks at work	✓			
Whether they think protective clothing is useful	✓			
Whether they find their protection comfortable	✓			
Whether their protection interferes with their work	✓			
F. REPORTED ACTION				
Dangerous activities undertaken away from work	✓			
Whether they take risks at work	✓			
Whether they take the necessary action to avoid danger	✓			

DISCUSSION OF SUMMARY TABLE 15

A. HISTORY, PRACTICE, KNOWLEDGE OF AND ATTITUDE TOWARDS FIRST AID

At the time when matches were being found for volunteers the necessary information was not available to allow matching on the criterion of previous first aid training. However, as is indicated by Table 15 the interview data showed that there were no significant differences in either the numbers previously trained in each group, or in their experience of using first aid, or in self-rating of their own capability or in their knowledge of first aid. The only significant difference under this heading was in the responses of the two groups to the sight of blood or injury. That non-volunteers claimed to be more upset by the sight of blood or injury was not unexpected and was probably one reason why they did not volunteer for training.

B. AWARENESS OF DANGER AND AWARENESS OF RISK-TAKING

Table 15 indicates that there were a number of differences between the responses of the two groups under this heading, particularly at Factory B.

At Factory B, the volunteers rated their jobs more dangerous than did the non-volunteers. The volunteers rated other industries as dangerous because of the hazards involved in the work more often than did the non-volunteers. In response to the question about types of risk that interviewees had seen other workers taking, volunteers more often reported seeing workers not wearing their personal protection, whereas non-volunteers were the more likely to cite carelessness and working unsafely. Finally, at Factory B the volunteers marked more of the items on the scale as being important causes of accidents than the non-volunteers did.

At Factory C, the volunteers claimed to have seen more of the workers around them taking risks than the non-volunteers did. However, more non-volunteers than volunteers claimed to be able to tell when an accident was going to happen to themselves either by seeing something to be unsafe or because they themselves were taking risks.

The findings under this heading, particularly from Factory B, suggest that before training the volunteers were more aware of danger and risk-taking than were those who did not volunteer for training.

C. <u>RESPONSIBILITY TO ACT</u>

Table 15 indicates that most findings under this heading support the null hypothesis that there was no difference pre-training between the groups in their acceptance of their responsibility to act.

In response to the question asking how many of the accidents at their factory they thought could reasonably be prevented, at Factory B the volunteers rated marginally fewer accidents preventable than the non-volunteers did. At the same factory the volunteers rated more of their experienced injuries unpreventable, and less the fault of management than the non-volunteers did. At Factory C the volunteers rated the injured person relatively less able, and management relatively more able to prevent serious injury than did the non-volunteers. It can be argued that if accidents were rated unpreventable this would cause more anxiety than if they were avoidable. This postulated increased anxiety of the volunteers may partly explain why they decided to learn first aid. However, there is no direct evidence to support this argument.

Most of the evidence under this heading does not allow the null hypothesis to be rejected. It is concluded that prior to the first aid training there was no difference between the groups in their perceived responsibility to act in order to prevent injury to themselves.

D. AWARNESS OF SAFE BEHAVIOUR (AND ITS AVAILABILITY)

Interviewees answered most of the questions designed to investigate this area in terms of responsibility to act, and so the responses have been dealt with under 'C' above. Only one remaining question provided evidence under this heading and in the responses to this there were no significant differences between the groups at either factory. In order to investigate this area in detail it would be necessary to ask detailed questions about precautions appropriate to respondents' jobs. Such questions if asked in an interview might well alter respondents' awareness. In fact, such questions included in the interview schedule at Factory A were found to be unsatisfactory (see Chapter 11). To obtain more useful information on this topic time consuming observation of behaviour would be necessary and it is beyond the scope of this research to investigate the area in such depth.

E. DECISION TO ADOPT SAFE BEHAVIOUR

Table 15 shows that results from most questions investigating respondents' decision to adopt safe behaviour produced no differences between the two groups. The only contrary evidence was from the study at Factory C where the volunteers claimed to be more willing than the non-volunteers to work in industries which they had cited as being dangerous. Therefore, there was little evidence to suggest that either group was more motivated to be safe or more willing to adopt safer behaviour prior to training.

F. REPORTED ACTION

There was no evidence that either group was more willing either to undertake dangerous activities or to take any necessary action to avoid danger.

SUMMARY OF THE PRE-TRAINING DIFFERENCES BETWEEN VOLUNTEERS AND NON-VOLUNTEERS

Under most of the headings A to F above it was not possible to reject the null hypothesis (that there were no pre-training differences between the two groups) at either factory. No differences were found in any of: their history of first aid training, or practice, or knowledge of first aid. There was some evidence, particularly at Factory B, to show that the volunteers for training were already more aware of danger and risk-taking than those who did not volunteer for training. There was no indication that the volunteers rated higher than the non-volunteers did their responsibility to take action to prevent injury to themselves. There was no evidence that the volunteers avoided more than the non-volunteers, dangerous activities outside work. Little evidence was available to compare the group members' awareness of safe behaviour and there was no reason to suggest that either group was more likely to adopt safe behaviour.

Evidence reported above shows that the volunteers claimed to have more minor injuries than the non-volunteers did and the injury accident data showed that, prior to training, volunteers reported more injuries to the surgery than the non-volunteers did. The difference in the number of injury accidents did not appear to result from differences in reporting rates.

There was no evidence from the interview data to support the criticism of FACTS that volunteers for first aid training were already more safety motivated and consequently safer than non-volunteers. However, this does not negate all the criticisms of the Orillia (FACTS I) study as no attempt was made in FACTS I to match trained and non-trained groups for risk-exposure.

Similarly, there was no strong evidence from the interviews to suggest that prior to training the non-volunteers were more safety motivated or safer than the volunteers.

POST-TRAINING DIFFERENCES BETWEEN THE VOLUNTEERS AND NON-VOLUNTEERS

This section discusses the main body of findings from the interviews and relates them to the findings from the injury accident data analysis discussed above. The results are considered in terms of the major hypothesis; that people trained in first aid are safer, that is have fewer injury accidents, as a result of their training. From this major hypothesis, and with reference to the discussion of the processes involved in accident causation (see Chapter 3) it is possible to generate a set of further hypotheses as follows:

A First aid trained respondents will have an increased knowledge of first aid and will be more positively motivated towards first aid than they were prior to training.

B People trained in first aid will become more aware of danger and risk-taking than they were prior to training.

C People trained in first aid will rate themselves more responsible for safety and accident prevention than prior to training.

D First aid trained employees will become more aware of safe behaviour than they were pre-training, and consequently the safe behaviour will be 'available' to them when it is required.

E People trained in first aid will become more likely to adopt safe behaviour than they were prior to training.

The raw interview data are in Appendix 21 and results from these data are summarised in Table 16 which follows. In this table the changes in volunteers' responses between pre- and post-training interviews are analysed with reference to the changes in non-volunteers' responses. Responses from the non-volunteers are taken as a baseline measure both pre- and post-training. For example, if volunteers rated themselves more likely to be injured at work post-training than pre-training, and there was no change in the responses of the non-volunteers, the table would indicate support for the hypothesis that first aid training makes people more aware of danger. The table would also indicate support for the hypothesis if there were no change in the volunteers' responses and the non-volunteers rated themselves less likely to be injured at work post-training than they had pre-training. If the responses of both groups remained the same or both changed in the same way, the table would indicate no support for the hypothesis.

Table 16 indicates which of the predictions based on the hypotheses listed above were and were not confirmed by the data from each of the factories. The following symbols are used in the table:

- √ A tick indicates that the finding supports one of the hypotheses A-E above.
- X A cross indicates that the finding is in the opposite direction to one of the hypotheses.
- = An equals sign indicates that the finding neither confirms nor goes in the opposite direction to one of the hypotheses.
- T Where a finding supports one of the hypotheses at one factory (and is indicated by √) and there was a non-significant trend in the same direction at the other factory, this is indicated by a T.

DISCUSSION OF RESPONSE CHANGES BETWEEN GROUPS FOLLOWING FIRST AID TRAINING

A. KNOWLEDGE OF FIRST AID, FIRST AID MOTIVATION AND COMPETENCE

(i) Knowledge of First Aid

It was hypothesised that trainees would have a better understanding of the most important first aid treatments and would therefore rate them as being more important than the common treatments such as those for minor cuts, bruises, fainting and so on.

TABLE 16

SUMMARY TABLE OF THE CHANGES IN RESPONSE OF THE VOLUNTEERS FOLLOWING TRAINING, WITH REFERENCE TO THE CHANGES IN RESPONSE OF THE NON-VOLUNTEERS

TOPIC	B	C
A. KNOWLEDGE OF FIRST AID, FIRST AID MOTIVATION AND COMPETENCE		
Knowledge of the most important first aid treatments	✓	T
Whether responded with treatments from the course	T	✓
Rated likelihood of requiring first aid knowledge	T	✓
Belief that everyone should be trained in first aid	✓	✓
Security felt at having people around them trained	✓	T
Number who would prefer more of their workmates trained	✓	✓
Rated ability to perform first aid	✓	✓
B. AWARENESS OF DANGER/RISK-TAKING		
Rated danger of own job	-	-
Why other industries rated dangerous	-	-
Rated likelihood of serious injury at work	✓	-
Rated likelihood of minor injury at work	✓	-
Whether they see other workers taking risks	-	-
What risks they see other workers taking	-	-
Number of causes of accidents rated as important	-	-
Whether they can predict when an accident is likely to happen to themselves	-	✓
How they can predict when an accident is likely to happen to themselves	-	-
Whether they can predict when an accident is likely to happen to somebody else	-	-
C. RESPONSIBILITY TO ACT		
What they think is necessary to avoid danger in their job	✓	T
Why they think serious injuries occur	-	-

TABLE 16 CONTINUED

TOPIC	B	C
C. Responsibility to Act (Continued)		
How the serious injuries could be prevented	√	T
Why they think minor injuries occur	-	-
How they think the minor injuries could be prevented	-	-
Rated number of accidents that could be reduced	√	-
How they think the number of accidents could be reduced	-	X
Why they think they themselves could do most to reduce the number of accidents	√	-
Which they think are the most important causes of accidents	-	-
How they can tell when an accident will happen to someone else	√	T
D. AWARENESS OF SAFE BEHAVIOUR (AND ITS AVAILABILITY)		
(No evidence was available on this topic)		
E. DECISION TO ADOPT SAFE BEHAVIOUR		
Rated worst types of injury	-	-
Why that type of injury was selected	√	-
Rated worst areas of body to injure	√	-
Reasons for selecting that type of area	-	-
Whether the danger in their jobs worries them	-	-
Whether they would prefer a safer job	-	-
Reasons for not wanting a safer job	-	-
Reasons for not getting a safer job	√	-
Whether they would work in another dangerous industry	-	√
Reasons for unwillingness to work in another dangerous industry	-	-
Why they take risks at work	-	-

TABLE 16 CONTINUED

TOPIC	B	C
E. Decision to adopt safe behaviour (continued)		
Whether they rate protective clothing useful	-	-
Whether they rate their protection comfortable	-	√
Whether they think their protection interferes with their work	-	-
F. REPORTED ACTION		
Number who claim to take risks at work	-	-
Whether they take the action necessary to avoid danger	-	√

Furthermore, it was predicted that they would mention more of the treatments taught on the course than would those respondents who were not trained.

Results from both factories indicated that, post-training, the trainees gave significantly more treatments that were included in the course and that were rated as most important first aid treatments; (a) than the trainees had done pre-training, and (b) than the non-volunteers did before or after the training.

(ii) First Aid Motivation

At Factory C the volunteers considered themselves more likely to come across a situation needing first aid knowledge than the non-volunteers did. A similar trend was found at Factory B but in this case it did not reach significance. Such a finding appears to suggest that people trained in first aid might go out of their way to look for first aid emergencies. However, other explanations are possible. It is possible that trainees had redefined first aid emergencies to include situation not previously classed as such. Alternatively, trainees might have seen themselves as being more useful in emergencies (possibly leading them to re-classify situations as requiring first aid) perhaps as a result of becoming more confident in their ability to render first aid, whereas previously they had not considered it their responsibility to offer aid.

This finding was supported by the fact that only two non-volunteers, compared with eleven trainees, had carried out first aid treatments (other than for minor cuts and bruises etc.) in the period between training and the post-training interviews.

Following their training, volunteers at both factories believed more strongly than the non-volunteers that everyone should be trained in first aid. However, at Factory C this finding was largely due to a change in the response of the non-volunteers, a finding which is difficult to explain. There was a change in the volunteers' response in the same direction as occurred at Factory B but the result was not statistically significant.

Following their training, the volunteers at Factory B claimed that they felt more secure than did the non-volunteers in having a number of people around them trained in first aid. The difference at Factory C was in the same direction but did not reach significance. At both factories significantly more volunteers than non-volunteers stated that they would have preferred more or all of their fellow workers to be trained in first aid.

These findings imply that the trainees had become more aware of the value of first aid and consequently were able to rely on others similarly trained to look after them if they were injured.

In conclusion, as a result of their training, the volunteers appeared to hold more positive values towards first aid training.

(iii) First Aid Competence

At both factories nearly all trainees thought that their knowledge of first aid had increased to some extent. At both factories, volunteers rated themselves better able to carry out first aid treatments than the non-volunteers did. In both cases this resulted from the volunteers rating themselves better able to carry out first aid treatments post-training than pre-training.

It is clear from these results that the trainees believed that their training had resulted in them being better equipped to carry out first aid treatments.

Because of the short period between training and the second interviews, few respondents had carried out any first aid treatments. However, all eleven trainees who had carried out first aid treatments claimed that they could not have coped as well prior to training.

It is clear from the preceding discussion that those trained had an increased knowledge of first aid and, also as a result of their training, they became more aware of the value of such training and felt more capable of carrying out treatments. These findings support Hypothesis A; that first aid trained respondents will have an increased knowledge of first aid and will be more positively motivated towards first aid then they were prior to training.

B. AWARENESS OF DANGER AND AWARENESS OF RISK-TAKING

Hypothesis B stated that people trained in first aid will become more aware of danger and risk-taking than they were prior to training.

From this hypothesis it was predicted that, following training, the volunteers would rate their jobs as being more dangerous. This was not found to be the case. However, it is possible to interpret the finding in a different way. A tentative explanation might be that trainees believed that they had more control over the danger as a result of their training and consequently the effect of the increased awareness of the dangers in their job was masked. This is clearly one area where further investigation is required.

Following training there were no significant changes in the reasons given for rating jobs other than their own as dangerous. The main reason given for rating other jobs as dangerous was the danger involved in the job. The jobs and dangers cited by both groups were similar.

Interviewees were asked to rate how likely they thought they were to have serious and minor injuries at work. At Factory C there were no significant changes in the findings from these two questions. At Factory B there were no significant changes in the responses of the volunteers. However, on both questions, the non-volunteers rated themselves less likely on the second interview than they had on the first, to have both minor and serious injuries. This change was highly significant in the case of serious injuries and resulted in the post-training comparison showing the volunteers rating of their chances of being seriously injured significantly higher. It is difficult to explain the change in the response of the non-volunteers, although it is interesting that the change was in the same direction on both questions. The change did not support findings from the injury accident data, but gave some confirmation to the prediction that following their training the volunteers would rate their likelihood of injury higher than the non-volunteers.

It was predicted that the trainees would become more aware of the types of behaviour which were most risky. At both factories a majority of respondents claimed to have seen people around them taking risks. However, there was no significant change in the response of either group.

Three main types of risk-taking were cited by respondents. Listed in descending order these were: (a) working wrongly or unsafely, (b) carelessness and rushing, and (c) not using personal protection. There were no significant changes in responses on the questions on risk-taking between the pre- and post-training interviews, for both groups.

There was no increase in the number of items selected by the volunteers from the list of important causes of accidents. This finding does not support the hypothesis that trainees become more aware of danger.

Some support for the hypothesis was found at Factory C on the question which asked whether they could predict (foresee) when an accident was likely to happen to them. Post-training at Factory C the volunteers claimed that they were better able to predict when an accident was likely to happen to themselves than they were able to pre-training. This was not found to be the case at Factory B. There were no significant changes in the reasons given for their ability to predict accidents to themselves.

There were no significant differences pre- or post-training, in the numbers from each group who claimed to be able to predict accidents to other people.

Most of the evidence available from the interviews provides no support for Hypothesis B, that first aid training makes people more aware of danger and of risk-taking. Only three findings from the two factories supported the hypothesis but these results were not supported by responses from the other factory.

C. RESPONSIBILITY TO ACT

Hypothesis C stated that, people trained in first aid will rate themselves more responsible for safety and accident prevention than prior to training. On analysis a number of questions provided evidence to test this hypothesis. This evidence can be sub-divided into two parts; responses from questions asking about the cause of injuries and accidents, and responses from questions asking about the prevention of injuries and accidents.

(i) Causes of Injuries and Accidents

Interviewees were asked why they thought serious and minor injuries occurred. In both cases the answers could be divided into three categories; (a) the injuries were caused by the workers themselves, (b) they were caused by management, or (c) they were unavoidable. The breakdown of responses was interesting in itself because large numbers of respondents rated minor injuries unavoidable, particularly in comparison with serious injuries. An obvious explanation of this finding is that minor injuries were considered unimportant and consequently not worth the effort of prevention, whereas serious injuries were worth the effort of prevention because of their unpleasant consequences. This argument implies that employees accept minor injuries such as cuts, grazes, bruises and so on, as part of their job. It became clear during the interviews that this was the case. A number of respondents from both groups who attended the interviews with visible minor injuries stated that they had not received an injury for some time. When questioned further they often stated that they expected to have such minor injuries regularly and did not consider them important or preventable. Despite this attitude, most injury accidents included in the injury accident data analysis were of a minor nature and significant reductions in the number of these reported by the trainees were found.

At both factories, pre- and post-training, the volunteers rated the individual worker relatively more responsible for serious than for minor injuries, and believed that more of the serious than of the minor injuries were preventable. These differences were not as marked among the non-volunteers. Both groups rated management equally responsible for the prevention of minor injuries as for the prevention of serious injuries. From this evidence it would appear that respondents, particularly the volunteers, differentiated between the causation and the preventability of minor and serious injuries. No changes were found for either group in the attribution of blame for minor or serious injuries between pre-training and post-training interviews.

Respondents were provided with a list of causes of accidents and asked to select those causes which they thought were the most important. The causes in the list were selected so that a comparison could be made of those marked which were the responsibility of, or could be influenced by the individual worker (carelessness, haste, thoughtlessness, and bad housekeeping), and those that were primarily the responsibility of management (poor working conditions, lack of safety training, bad supervision, and unsafe equipment). The comparison was made by totalling the number of responses on both the individual and the management factors. In general, individual factors were rated more important than management ones by all groups, and no changes resulted following the first aid training.

Interviewees were asked how they could tell when an accident was likely to happen to someone else. Responses were divided into two categories; (i) those in which the individual could be blamed (for example for not using personal protection or by taking risks) and (ii) those in which the imminent accident was either accidental (for example through inexperience) or the fault of management (for example through the existence of unsafe plant or equipment).

The only significant difference was at Factory B where post-training, relatively more volunteers blamed the individual than had done pre-training. At Factory C a similar - but insignificant - trend was found for both volunteers and non-volunteers.

In conclusion there was little evidence that, following training, volunteers rated the individual worker or themselves more responsible for causing accidents.

(ii) Prevention of Injuries and Accidents

Respondents were asked what actions they thought were necessary to avoid the danger in their jobs. There were no significant changes in the responses of the volunteers at either factory. However, at Factory B in the post-training interviews, non-volunteers mentioned taking care or caution less and placed more emphasis on the role of management in accident prevention than they had in the pre-training interviews. A similar trend was found at Factory C. This finding though difficult to explain, gives some support to Hypothesis C, that trained employees will rate themselves more responsible for safety than will untrained employees.

Interviewees were asked how serious and minor injuries could be prevented. In both cases responses could be allocated to one of three categories; the injuries could be prevented either by (i) the individual worker, or (ii) by management, or (iii) the injuries could not be prevented.

Following training at Factory B, the volunteers rated the worker far more capable of preventing serious injuries and fewer serious injuries as unavoidable, than the non-volunteers did. A similar trend was found at Factory C. In the case of minor injuries no significant changes occurred following training.

Following training at Factory B the volunteers rated more accidents in their factories preventable than they had prior to training. The non-volunteers rated fewer accidents preventable. The respondents were also asked to say what they thought could be done to reduce the number of these accidents. Responses were divided into two categories; what the worker could do, and what management could do. The only significant change following training was at Factory C where the volunteers rated the worker less able to prevent the accidents and management more able to prevent accidents than they (the volunteers) had thought prior to training. This finding appears to contradict Hypothesis C. It is difficult to explain this result in the light of the preceding evidence but it suggests that this question may have been perceived differently from the earlier ones. One possible explanation is that the earlier questions implied that the injuries were ones which had or could have happened to the interviewee, and that the latter question referred to accidents in the factory as a whole, i.e. areas outside the individual's influence.

One further question was specifically directed at responsibility for safety. Interviewees were asked to rate different groups in the order of their responsibility for safety, and then to say why they had selected their first choice. There was no difference either between groups, or in volunteers' responses before and after training, in the order given. This was (1) self, (2) other workers, (3) supervision, (4) management, and (5) unions.

An analysis was made of the reasons why respondents had put 'yourself' first (by far the most popular response). Responses were separated into two categories. The first consisted of responses that suggested actions individuals could take to prevent accidents. The second category consisted of responses which did not suggest action, for example responses such as 'I'm the one who gets hurt'. At Factory B there was no difference pre-training but post-training, volunteers responded relatively more often with actions that should be taken by the worker to prevent accidents, and less often with comments in the second category, than did the non-volunteers. This change is accounted for by the volunteers changing their responses. This finding might be interpreted as support for Hypothesis D in so far as it implies that the trainees might have considered ways in which accidents could be avoided and consequently safe behaviour is more available to them. At Factory C there were no differences between the groups, with relatively fewer actions suggested in all cases than at Factory B

A number of findings in this section, particularly at Factory B, supported Hypothesis C, that the trainees would rate their responsibility for accident prevention higher as a result of their training. This was not, however, a consistent finding. Nevertheless the tendency was important because workers must believe themselves to be responsible for, as well as capable of preventing injury to themselves if they are to become involved in fewer injury accidents.

D. AWARENESS OF SAFE BEHAVIOUR (AND ITS AVAILABILITY)

As stated above, although a number of questions were designed to investigate the area of awareness of safe behaviour, responses given by respondents were expressed as responsibility for action and not as awareness of specific safe behaviour. Consequently, answers did not provide information needed to test Hypothesis D, that first aid trained employees will become more aware of safe behaviour than they were pre-training, and consequently the safe behaviour will be 'available' to them when it is required.

E. DECISION TO ADOPT SAFE BEHAVIOUR

If safe behaviour in a particular situation is available to employees, they must also make the decision whether to adopt this behaviour. This decision will depend to a large extent on how motivated workers are to be safe, that is to avoid injury. Hypothesis E stated that; people trained in first aid will become more likely to adopt safe behaviour than they were prior to training. A number of questions were designed to measure motivation to be safe.

It was predicted that following training the volunteers would develop a more accurate awareness of the worst types of injury, and the worst parts of the body to injure. When giving reasons for selecting these worst types of injury and area, the trainees would concentrate more on the physical aspects of the injury, and respond less often with general emotional statements such as, 'that would be a frightening type of injury'.

As described in Appendix 9, weighted orders of seriousness of types and areas of injury were developed by asking occupational health nurses to rank the listed items. It was predicted that following their training, the volunteers' responses would show closer agreement with those of the nurses.

There were no significant changes in the types of injury the respondents would least like to suffer, although the trained groups tended to agree more with the nurses following their training. There were no changes at Factory C in the reasons given for selecting the most important types of injury. Following training at Factory B, the volunteers placed more emphasis on the physical effects of the injury and less on other factors such as fear of that type of injury.

The responses given to the question on the area of the body they would least like to injure were again compared with the responses of the occupational health nurses. There were no changes at Factory C but at Factory B the volunteers showed significantly closer agreement with the nurses following their training.

There was no change at either factory in the reasons given for selecting those areas of the body as the worst to injure.

The majority of respondents at both factories were not worried by the danger involved in their jobs and there was no significant change in the volunteers' responses following training. There were also no significant changes following training in the number of respondents in each group who would have preferred to do a safer job, or in the reasons given for not wanting a safer job. Reasons such as enjoyment of or satisfaction with their present job were generally given as a reason more frequently than the claim that their own job was safe enough.

It was possible at Factory B to analyse the reasons given by respondents for not getting a safer job, when they had claimed they would prefer one. Following training,signficantly more volunteers claimed that they would like to find a safer job if it were possible, or that they had found and were moving to a safer job soon, than had said this pre-training. Relatively fewer said that they didn't get a safer job because they liked their present one or because they were used to it. This finding gives some support to the hypothesis that trained employees would become more willing to adopt safe behaviour.

There were no significant changes at Factory B in the claimed willingness of respondents to work in the industries they had cited as dangerous. Pre-training at Factory C the volunteers claimed to be more willing than non-volunteers to work in such industries. Post-training the difference in willingness expressed by the two groups was not significant, as a result of a change in the volunteers' rating. (This change in itself did not reach significance). This finding lends further support to Hypothesis E.

There were no significant changes in the reasons given for not wanting to work in other dangerous industries. Surprisingly, the specific danger involved in the job was rated less important than other, more emotional factors such as phobias and the lack of appeal of the job to the respondents.

Respondents were asked why they took risks at work (i.e. why they decided not to adopt safe behaviour). It was predicted that, following training, the volunteers would only condone such behaviour when it was absolutely necessary. However, no significant changes were found following the first aid training.

One measure of willingness to adopt safe behaviour was the attitude towards personal protection. It was predicted that if trainees became more willing to use their protection, they would rate it more useful, comfortable, and less of an interference to their work than they had prior to training.

Nearly all respondents rated their protection useful but they were equally divided about its comfort. The only significant difference on the question about comfort was post-training at Factory C where significantly more volunteers rated their protection comfortable, than had done prior to training. This difference was the result of changes in opposite directions in the two groups. At Factory B there were non-significant tendencies for more respondents from both groups to rate their protection more comfortable post-training.

There were no significant changes at either factory in the responses to the question asking whether their protection interfered with their work. However, again at Factory C, there was a tendency for fewer volunteers to rate their protection as an interference post-training than had done pre-training.

These findings give some support to the prediction that volunteers will rate their protection more comfortable and less of an interference following their training. These findings support those from Factory A.

In conclusion, there is some evidence to support Hypothesis E, that trainees will be more motivated to adopt safe behaviour following their training. However, not all findings supported the hypothesis.

F. REPORTED ACTION

It was predicted that the volunteers would claim to take risks less often, and would claim to take the action necessary to avoid the danger involved in their job more often post-training than pre-training.

There were no significant differences in the number of respondents who claimed to take risks at work either pre- or post-training. However, at Factory C there was a non-significant tendency for volunteers to claim that they took risks less often post-training than they had claimed to do pre-training.

At both factories a majority of respondents claimed that they did take the necessary actions to avoid danger on all occasions. However, following training at Factory C, significantly more volunteers claimed to take the appropriate actions than had claimed this pre-training. There was therefore some evidence from Factory C that trainees adopted safe behaviour more often following training than they had prior to training.

CONCLUSIONS FROM THE CHANGES IN RESPONSES OF THE GROUPS FOLLOWING THE FIRST AID TRAINING

Of the significant changes in responses of the groups between pre- and post-training interviews all but one supported the five hypotheses discussed above. However, no evidence was available about awareness of safe behaviour, and the results from the other areas were not consistent.

There was clear evidence from both factories that the trainees' knowledge of first aid had increased, that they had a more positive attitude to first aid, and that they felt themselves to be more competent to carry out treatments than prior to training. These findings were a positive indication of the direct results of the training, rather than of the indirect, safety-related effects.

Few of the findings indicated that the trainees' awareness of danger and risk-taking had increased as a result of their training. There was evidence, particularly at Factory B, that the trainees became more aware of their personal responsibility for preventing accidents to themselves.

Some findings from the interviews supported Hypothesis E, that trainees would become more likely to adopt safe behaviour, although many of the findings did not provide supportive evidence. Finally, there was some evidence that more trainees claimed to adopt safe behaviour than did prior to training.

The findings from the interviews therefore go some way to confirming the postulated connection between first aid training and accident involvement. It is possible that the questions in the schedule were not sensitive enough to test the areas adequately but it is encouraging that only one finding contradicted a prediction based on the five hypotheses. It is clear that more detailed investigation is necessary before the connection between first aid training and accident involvement can be fully explained, but the results reported here suggest that the changes may be more in the areas of responsibility and motivation than in that of awareness. The findings from the pre-training interviews indicated that the volunteers for training were already aware of danger and risk-taking and it would seem to be necessary to have this safety awareness before first aid training can influence injury accident involvement.

THE FIRST AID TRAINING

The discussion of the first aid training exercises (see Chapters 13 and 14) indicated that attempts were made to improve the standard of the instruction at each factory. Observation of the training sessions and reports from the instructors suggested that the standard of instruction had improved between factories B and C.

The following sections look at the trainees' reactions to their training and how far their expectations of the course were confirmed.

TRAINEES REACTIONS TO THEIR FIRST AID TRAINING

A number of questions were asked only of the volunteers on the post-training interview. These attempted to measure the effect of the training on their perception of first aid.

All trainees at both factories said they would encourage other people to learn first aid, generally because it is useful or important to know. Two trainees said they would encourage others to learn first aid because it would make them safer. Half of those trained claimed that they had encouraged others to learn first aid, mainly their friends, workmates or close family.

About half of those trained claimed to have told someone how to do some first aid since they were trained, again mainly their friends, workmates and close family. The areas they had discussed or demonstrated were those covered on the course, with artificial respiration the most common.

Nearly all trainees said they would like to take a refresher course at some time in the future. Similarly, a large majority at both factories said they would like to take a full first aid course, but only about a quarter of these volunteers had made any effort to find out about such courses or to become enrolled on one.

A majority of trainees thought the training would be useful to them even if they never needed to treat anyone. The most common reason given was that they had the ability to help even if it were never needed.

Only two of the trainees interviewed did not still have their 'Digest of First Aid' at the time of their post-training interview. Trainees had read their booklet an average of over two times at Factory B and almost four times at Factory C. (These averages excluded the three trainees at each factory who claimed to have read their booklet frequently).

These findings indicate that the trainees were generally pleased with their training and had been encouraged to learn more, or at least to keep their knowledge up to date.

VOLUNTEERS' EXPECTATIONS OF THE COURSE AND HOW FAR THESE WERE CONFIRMED

Questions were included in the pre-training interview schedule to find out what the volunteers expected to gain from their first aid training. Questions were asked post-training to see whether these expectations had been fulfilled.

A significantly larger number of volunteers claimed that their attitude towards safety had changed as a result of their training, than thought their attitude would change prior to their training.

There was no difference between the number of volunteers pre-training who thought their way of working would be affected by their training and the number who claimed post-training that their way of working had altered as a result of their first aid training. Few respondents thought they would learn about anything other than first aid treatments and this appeared to be confirmed by their post-training responses. Few respondents claimed that they had learnt anything about safety during their training. This finding suggests that the training was successful in so far as it avoided direct reference to safety.

In conclusion, respondents did not claim to have been surprised by the content of the training courses or by the effect that the training would have on them. Despite the first aid propaganda at Factory C, the volunteers at Factory B thought that the training would have more influence than did those at Factory C on the way they worked.

GENERAL REACTIONS TO THE FIRST AID TRAINING

Questions were included in the post-training interview schedule to measure the trainees' reactions to the course. There were no major differences in the responses of the trainees' at the two factories. Most trainees rated the training interesting, worthwhile, relevant, and about the right level of difficulty. About half the trainees thought that there was about the right amount of detail for the time available. Most respondents at both factories claimed that they had got what they wanted from the course, and that their knowledge of first aid had increased either a little or quite a lot. When asked what could be done to improve the course an equal number of trainees at each factory thought it should be longer and that it should contain more information. Few criticisms were made of the actual content and delivery of the course.

Two interview findings indirectly supported the view that the training at Factory C was better than that at Factory B. Trainees were asked when they thought they would need a refresher course. The mean time suggested at Factory B was twelve months from the time of training compared with a mean time of fifteen months at Factory C. The other indirect support was the finding that trainees at Factory C claimed to have read their 'Digest of First Aid' on average twice as often as the trainees at Factory B, at the time of the post-training interviews.

In conclusion, the trainees at both factories appeared to be reasonably pleased with the training course they received. There was little evidence from the interviews that the training at Factory B was inferior to that at Factory C. If anything, more findings from Factory B than from Factory C supported the five hypotheses.

PART VI: CONCLUSIONS

CHAPTER 20

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

CONCLUSIONS ON THE MAJOR HYPOTHESIS

The research reported in this thesis confirmed the major hypothesis that training in first aid reduces people's injury accident rate. The strongest support for the hypothesis came from Factory C where first aid training combined with first aid propaganda led to a significant reduction in the number of injury accidents suffered by trainees. A similar reduction occurred at Factory B when the change in the trainees' injury accident rate was compared with the change in the injury accident rate of the untrained matched control group. Prior to training at both factories the volunteers for training had a significantly worse reported injury accident record than the non-volunteers. Following training there was no difference in the injury accident rates of the trainees and their matched controls at either factory. This last finding contradicted the findings of the Canadian studies described in Chapter 2 which demonstrated that first aid trained employees suffered less accidents than non-trained employees.

One criticism of the Canadian studies was that, because no pre-training measures were taken, volunteers for first aid training might already have been safer than workers who did not volunteer for training. This criticism was directly contradicted by the pre-training injury accident data from Factories B and C. However, interview data did indicate that the volunteers for training were more aware of danger and of risk-taking than were the non-volunteers.

There was clear evidence from the factory studies that the trainees' knowledge of first aid and their self-rated competence to carry out treatments increased following training and that they developed a more positive attitude towards the benefits of first aid training. In other words the first aid training succeeded in its primary purpose.

At Factories B and C, there was little evidence that the trainees' awareness of danger and of risk-taking increased as a result of the first aid training, and no evidence was available to test the hypothesis that trainees developed a greater awareness of safe behaviour. The interviews at Factories B and C indicated that trainees became more motivated to avoid injury and that they rated their personal responsibility for injury avoidance higher as a result of their training. These findings partly explain how first aid training affects injury accident rate.

As a result of these findings the following tentative theory is postulated: first aid training motivates trainees to be safer, i.e. to adopt the appropriate safe behaviour in a given situation. But to do this, it is also necessary for trainees to be aware of the appropriate safe behaviour. This awareness would have to derive from safety training, propaganda, etc. If this theory were correct it would imply that first aid training combined with some form of safety training would maximise injury accident reduction. There is no evidence from this study to test this theory. However, the fact that the Canadian first aid training included specific safety training might explain their consistently larger improvements in injury accident rate of first aid trainees.

Neither the 'cause and effect' examples used at Factory B, nor the first aid propaganda used at Factory C were introduced to the study completely successfully. As a result the study was not a conclusive test of them. The steady but gradual increase in the size of the effect on injury accident rate through the three factories was most probably caused by the improvement in the content and standard of presentation of the first aid course.

CONCLUSIONS ON THE CONDUCT OF THE FIRST AID TRAINING AND ITS ORGANISATION

This project has demonstrated the value of a four hour emergency first aid course for injury accident reduction.

It became clear during the factory studies that a specific teaching manual was required as opposed to the 'Digest of First Aid' which was basically a reference book. The developed instructors' notes (in booklet form) and objective cards used at Factory C were the first such teaching material produced by St. John Ambulance. As a result of this research therefore St. John Ambulance have become aware of the need for teaching manuals for their various courses.

The training sessions at Factories A and B demonstrated the need for careful selection and training of instructors in order to maintain a sufficiently high level of instruction. It was shown at Factory C that instructors who had received extensive training developed a greater interest in their teaching and that the standard of instruction was much higher. The Training Officer of St. John Ambulance, who was closely involved with the factory studies, has recognised the value of stricter selection and training of instructors for general first aid training.

Observation of the training at Factories A and B indicated variability of presentation and content of the course. This variability was largely due to inadequate training of instructors and to the lack of a teaching manual. Standardisation of training was particularly necessary where classes received instruction from more than one instructor. Lack of standardisation has wider implications for general first aid training, but these are outside the scope of the present study.

Other problems were encountered in relation to the first aid training. These included the most effective content of the training courses and treatments which industrial first aiders require knowledge of. Again these problems went beyond the scope of the present research but they are areas requiring systematic investigation.

RECOMMENDATIONS FOR FURTHER RESEARCH

The factory studies were designed as pilot studies for a future community study at Leek in Staffordshire. This project is now well underway and has developed techniques used in the factory studies and benefited from the four hour first aid course developed for Factory C. Although the Leek project presents different problems from those encountered in the factory studies, in particular overcoming the poor sources of injury accident data, it is essentially similar in nature.

Further studies should be directed towards investigating in more detail how first aid training affects injury accident rate. The present project investigated the most fruitful areas of study but did not fully explain the causal relationship. Interview techniques could be used to investigate in more detail the hypotheses generated during this research. Observation techniques could be used to investigate areas inadequately covered by the interviews, such as the use of personal protection and risk-taking behaviour.

The finding that the volunteers for first aid training were less safe than those matched controls who had not volunteered for training was both surprising and interesting. It is possible to speculate that the volunteers, who had suffered more injury accidents and who were more aware of danger than the non-volunteers, realised the need for such training in order to treat injuries when they occurred. A further possibility is that some other factor, perhaps a personality trait, may have affected both injury accident rate and propensity to volunteer. Research could be directed towards a more detailed investigation of the factors which influence people to volunteer for first aid training.

An important area for future investigation is the theory advanced above, that first aid training combined with safety training will maximise reductions in injury accident involvement. Such research would involve the identification of relevant safety information, the design of the form in which it should be taught, and the construction of a course which logically combines the first aid and safety inputs. Other questions requiring investigation would include who should teach the safety input and whether a package could be developed which was of general relevance or only of specific relevance to particular processes or industries.

Further research could be directed towards a more detailed investigation of the value of 'cause and effect' first aid training and first aid propaganda. However, both these aspects would necessarily be built into a package which combined first aid training and safety training.

The factory studies have indentified a number of problems that exist with general industrial first aid training. These problems have been incidental to the main aims of this research but it is clear that the whole field of industrial first aid training requires investigation. Concern has been expressed recently by the Medical Advisory Committee of the Health & Safety Executive, Working Party on Occupational First Aid who have been investigating many aspects of occupational first aid (see McKenna, Glendon and Hale, 1977 for further discussion).

APPENDICES

APPENDIX 1

ORILLIA INSTRUCTORS' NOTES

TO ALL INSTRUCTORS
PROJECTS FACTS

THIS PAPER HAS BEEN PREPARED TO BE DELIVERED VERBATIM BY INSTRUCTORS AT THE COMMENCEMENT OF ALL FACTS FIRST AID COURSES IN ORDER TO ASSOCIATE FIRST AID TRAINING WITH ACCIDENT PREVENTION.

Project FACTS is a programme of controlled safety research being undertaken in Orillia under the joint sponsorship of the Workmen's Compensation Board of Ontario and St. John Ambulance.

For the first time anywhere this project will test the theory that extensive First Aid training can lower the accident rate in industry and throughout a community.

The aim is to make everyone in Orillia a trained First Aider. Included will be those employed by business, industry and the professions, housewives, civic employees and students from elementary to community College level.

Your participation will help to make Project FACTS a success.

First Aid training for Orillia's citizens should make it the safest place in Canada - and perhaps in the world - in which to live, work and play.

First Aid training and accident prevention are closely related. First Aid training must make you accident conscious. In many cases accident prevention could alleviate the requirement for First Aid, and eliminate the pain and cost that result from accidents.

All First Aid lessons must stress accident prevention and I will mention this on every suitable occasion. Accident prevention means not only preventive practices in industry, but includes precautions at work, at home, and during leisure hours. 80% of all accidents take place outside of working hours. Your personal accident prevention programme must start now. It may include use of safety belts in your automobile, careful use of a mechanical lawnmower, use of safety equipment at work or at play - and many more - all are part of your accident prevention programme (try to involve your family in this - with the children make it a game).

To ensure the success of Project FACTS we must stress accident prevention during all training and you must carry the lessons from the class to your work and your homes. The loss of working hours and leisure hours affect all of us. Accident costs are borne by all. It is not possible to estimate the cost when a father, mother or a member of the family is injured, maimed or killed.

Let us all start our own personal accident prevention programmes - and feel free to relate your programme with any of the First Aid lessons being taught by the FACTS project.

(continued)

We have a large background of statistics and costs. We know that 10,000 to 12,000 hospital beds are occupied daily by accident victims and that each bed costs about $65.00 to maintain daily. We know that industrial accidents cost 3/4 billion dollars annually - we know that accident costs are rising each year. We know the high costs in man hours and wages lost. We know the sorrow caused and the pain inflicted whenever accidents occur but we are inclined to dismiss these as "never happening to me".

DO YOUR PART FOR YOUR FAMILIES SAKE, YOUR JOBS SAKE, AND YOUR OWN SAKE!

TO ALL INSTRUCTORS

PROJECT FACTS

THIS PAPER HAS BEEN PREPARED TO BE DELIVERED VERBATIM BY FACTS INSTRUCTORS AT THE COMMENCEMENT OF THE THIRD SESSION (LESSON 7) OF THE EMERGENCY FIRST AID COURSE AND THE FIFTH SESSION (LESSON 16) OF THE STANDARD FIRST AID COURSE IN ORDER TO ASSOCIATE FIRST AID TRAINING WITH ACCIDENT PREVENTION.

N.B. INSTRUCTORS SHOULD FEEL FREE TO INTRODUCE ACCIDENT PREVENTION MEASURES DEALING WITH SPECIFIC DANGERS IF THEIR CLASS IS DRAWN FROM A PARTICULAR INDUSTRY OR INDUSTRIES

At the commencement of this course I spoke briefly about FACTS and introduced Accident Prevention. At that time I urged you all to start your own personal Accident Prevention programme at work, and at home. I want now to emphasise the connection between First Aid and Accident Prevention.

Knowledge of First Aid is something everyone hopes they will never have to use. The best way to avoid using it is for yourself and your friends to become safety oriented and stress Accident Prevention. Remember that 80% of all accidents take place away from work.

Developing a continuing awareness of accident causing situations is more than half the battle in avoiding them. You can help yourself to acquire this by gaining some idea of the types of accidents that occur more frequently.

Let us deal only with accidents which resulted in death during the last year. The pattern is the same, year after year.

As would be expected, traffic accidents are the most common and account for about half the loss of life, with accidents in the home second, causing 20% of all accident fatalities. Drowning comes next with nearly 10%.

While we do not want to flounder in a sea of statistics, there are some important lessons for everyone in a more detailed breakdown.

Over 60% of traffic fatalities occur in vehicle collisions or running off the road. Keeping cars in good condition, defensive driving, and the regular use of seat belts would result in a spectacular reduction in deaths, suffering and costs.

About 25% are pedestrian fatalities and 70% of these are to children under 15 and adults over 55. People of all ages should develop a healthy respect for, and a full consciousness of, pedestrian safety precautions and children should not be allowed to run or play in the streets.

In the home, the most frequent cause of accident death is falling. Falls from regular or improvised ladders, falls downstairs, falls in bathtubs and tripping over rugs, all occur with distressing regularity.

If stairs are well lighted, equipped with safe handrails, and were kept clear of all miscellaneous objects usually put there to be carried up or down, this accident rate would be cut substantially. There should also be handrails and non-skid mats beside bathtubs, and the bottom of the tub should have non-skid strips.

If ladder substitutes, such as chairs, stools, counter tops, boxes, etc. were never used, much trouble would be avoided. And if all ladders were kept in good repair, used only on sound footing and treated with respect almost all ladder accidents would disappear.

Small mats, rugs or carpets on a slippery floor are a menace. They should not be used without non-skid backing and even then they are a major hazard for the elderly to trip over.

The next most common home fatality is from fire. Becoming conscious of the danger is the key to safety because you will see things differently. Be sure your electric wiring is adequate for the load it has to carry. Look at each area ofyour home and your habits with stoves, fireplaces, Christmas trees, etc. through the eyes of a Fire Chief looking for fire hazards.

You will be surprised how many you can find to remove or reduce. Remember that a neat house seldom catches fire. If you want more help, call on your local Fire Department. Your own fire fighter will be delighted to inspect your home free of charge.

You should also decide upon, and make sure that everyone in the house understands, the best ways to get out if a fire does start.

A major danger, mainly to young children, is suffocation. It goes without saying that they should not be left alone in the home and that dangerous materials such as plastic bags, must be kept well out of reach and never used in or around a crib. Do not leave tiny toys, pins, buttons, beads, etc. where a child can reach and swallow them.

Poison is an important cause of fatal accidents in the home. While we might expect that, like pedestrian accidents, the great majority would involve children or older people, this is not the case. About 42% are in the middle age group and most result from real carelessness.

Household poisons are dangerous to <u>all</u> members of the family.

In Canada, products which are poisonous, flammable, explosive, or corrosive will be required after June 1 1971, to carry a hazard symbol showing the type and degree of danger.

Watch for these labels and take adequate precautions.

Home accidents stem from much the same situations in urban or rural areas. But there is one hazard to the farmer that is greater than to the city dweller, and seems to be increasingly steadily - that is the hazard of machinery. 40% of all deaths from accidents involving machinery occur on the farm, as opposed to 35% in all industry.

Also, it usually takes longer to get medical aid in rural areas, and is therefore more than ever important for the farmer, his family, and employees to have a good basic knowledge of safety precautions and at least emergency First Aid.

The final common cause of accidental death is drowning and about 25% of all drownings involve some kind of water craft. Some 55% of the victims are under 25 years old and the ratio of men to women is five to one.

Never swim alone, observing water safety rules and water-skiing safety regulations, and having anyone who uses the water trained in mouth-to-mouth resuscitation, would cut these fatalities at least in half.

Accidents like these <u>can</u> happen to you. Isn't it worth your while to become safety conscious?

Your First Aid Training will prepare you to look after the accident victim. How much better if you could assist in eliminating the accident. Start in your own home - at work - at play - eliminate the hazard - be safety conscious. Your fellow workers, friends, your family along with you yourself will benefit.

Here are some comparisons for your compiled by large industries:

<u>CANADIAN NATIONAL RAILWAYS</u>

ACCIDENT STATISTICS ON THE JOB

For every 1 death - 33 are hospitalized and 300 require First Aid.

<u>BELL CANADA</u>

For every 1 employee killed at work, 10 employees are killed off the job.

For every 1 employee injured at work, 10 employees are injured off the job.

APPENDIX 2

ORILLIA PUBLICITY

18 July 1972

FACTS PUBLIC RELATIONS PROGRAMME

1. A brochure was prepared outlining the project, how it would operate and its purpose. This was distributed with the Saturday edition of the local paper.

2. Press kits were prepared for the organisation meeting of the Advisory Committee which was covered by the newspaper, radio and television.

3. Arranged for the Mayor to present certificates to City Council Chambers to first class of new Instructors. Covered by all media.

4. Speakers were provided to men's and women's service clubs.

5. Visit to Orillia of Secretary-General of the Order was publicised in advance. He was interviewed by the press and radio.

6. A member of the Workmen's Compensation Board and one from St. John appeared on a one hour phone-in radio programme answering questions about FACTS.

7. All school principals were visited and the project explained to them in relation to the school programme.

8. All businesses, industries and schools conducting First Aid classes were presented with plaques which read "We support Project FACTS".

9. Speech notes and brochures were supplied to the women's committee for contacting all women's organisations.

10. FACTS brochures were sent to all insurance companies.

11. At Kinsmen's Snowmobile Rally, five St. John Snowmobiles demonstrated their snowmobile rescue technique and this was covered by a crew from CBC-TV.

12. A special meeting was held with the Orillia Labour Council at which a panel explained FACTS and asked for Union support in making the project a success.

13. A series of small ads were placed in the local paper and a series of radio spot announcements were produced for use on the radio.

14. Class dates and times were supplied on a regular basis for a "Calendar of Events" which was a promotion of Rothman Tobacco Co.

15. Flags and cards were awarded to all industries and small businesses that had trained 100% of their employees, or were participating in an effort to train 100% by the end of the project. Flags were flown on City Hall, the Fire Department, the Orillia Water, Light & Power Company, the Police Department, etc.

16. Free promotion was carried on Cable television showing dates and times of classes scheduled.

17. A bookmark was designed and produced and was distributed through the public library and the schools.

18. A button was designed and distributed to everyone taking a First Aid course. It read "I Support FACTS".

19. A Church Bulletin cover was prepared and offered to churches. The back page described FACTS, the progress of the trianing and urged participation by all. 4,000 of these were distributed through Orillia churches.

20. The story of FACTS was presented to the Industrial Accident Prevention Association's Annual Conference in a videotaped production for which the script was prepared and a cameraman taken to Orillia to photograph pertinent footage on film which was then converting to video tape with a voice-over.

21. An exhibit was set up at the Orillia Home and Sportsmen's Show to promote FACTS.

22. The Construction Safety Training Trailer was stationed in Orillia outside City Hall for three days. Staff accompanied it and promoted FACTS by showing safety films and distributing FACTS literature.

23. Full page newspaper ads were purchased several times.

24. A pair of season hockey tickets was donated and offered as a draw prize to any enrolling in a First Aid course. A full page ad was inserted in the newspaper for this with a coupon that could be used to register for the course.

25. A regular interview programme carried by the radio station was donated to FACTS for a week and representatives of St. John, Workmen's Compensation Board, industry, labour took part.

26. The course was offered free of charge to unemployed people and to those 65 years of age and over.

27. Tear sheets of full page ads were sent to industry for in-plant promotion by using them on bulletin boards.

28. A special article was written for the Orillia & District Labour Council Newsletter which is distributed to its 2,000 members.

29. Dr. L.J. Calvert, our Provincial Surgeon, presented First Aid certificates to student nurses at the hospital and addressed the group.

30. In September, 1971, the Mayor proclaimed the week of September 13 as FACTS Week and a special flag raising ceremony was held at City Hall, using the FACTS flag.

31. Special meetings were held with Personnel Managers of the larger companies and a kit was prepared and given to them to help publicise FACTS and encourage employees to sign up for First Aid courses.

32. A letter was sent to the 75 organisations and clubs in Orillia urging their members to take the training and offering to provide a speaker for one of their meetings.

33. Special publicity was generated by announcing training milestones such as the 3,000th trainee, etc.

34. A special dinner was held for all those who were involved in the project and PVOT's presented to the news media and others for their special assistance in getting the project launched.

35. Newspaper fillers were written and distributed to weekly and daily papers giving short items about FACTS.

36. A telephone canvass contacted every household with a listing in the telephone directory in an effort to round up any who had not been trained. This was announced in the press.

37. Ads were run soliciting stories of how First Aid had been used in an emergency and First Aid Kits were awarded for the best anecdotes.

38. Dozens of releases were sent to all the news media regarding items of interest throughout the whole project. We had an excellent reception from the news media and our releases were used without exception.

39. It is planned to have a final meeting of the Advisory Committee to report on the project in October when General Sir William Pike will be in attendance. We hope to get him on radio, television and in the newspapers with his comments on how this project has sparked other programmes throughout the world.

40. A full page ad was inserted in the local newspapers announcing the closing of the FACTS office and thanking the citizens of Orillia for their co-operation.

Questionnaire

Interviewer ________________________________ Date ______________

Interviewee ________________________________ Sex ___M ___F

Time interview starts ____________________

Location (Home, work, etc.) ____________________

1. About one year ago we interviewed some people about Project FACTS--
   were you interviewed at that time?

   __yes __no

2. Are you employed?

   A. ____No

   ____Housewife

   ____Student

   ____Other ______________________________________ (Specify)

   B. ____Yes Occupation ______________________________________

   ____full-time ______ supervisory

   ____part-time ______ hourly

   ______ salaried

   ______ owns own business

3. Marital Status

   ____Married

   ____Single

   ____Widowed

   ____Other ______________________________________(Specify)

APPENDIX 3

ORILLIA QUESTIONNAIRE

4. Children? ___No

___Yes Number__________

5. Did you take the St. John Course

___yes

___no [go to No. 8]

6. Did you complete the course?

A. ___Yes
When? ___________ _____
month year

B. ___No
Why didn't you complete it?

____

____

____

7. Have you had any previous first-aid training?

____No

____Yes What course _______________________________

____

When _______________________________
[go to No. 10]

8. Have you had any first aid training?

___No

___Yes What course _______________________________

____

When _______________________________

9. Were you aware of the St. John first aid course?

A. ___No [go to No. 14]

B. ___Yes How did you hear of it

___through job ___other ______________________(Specify)

___through school

___advertising

___T. V. ___family ___co-worker

___Radio ___friends ___other______________.

___Newspaper

Why didn't you take the course?

____

____

____

[go to No. 14]

10. How did you learn about the St. John Course?

_____through job

_____through school

_____advertising

_____T. V.

_____Radio

_____Newspaper

_____Other ______________________________________ (Specify)

Recommended by

______family _____co-workers

______friends _____other ____________________(Specify)

11. Why did you enroll in the St. John Course?

____job requirement

____school requirement

____as a member of an organization (scouts, service clubs, etc.)

________________________________(Specify)

____for your own interests and needs ________________________________

________________________________(Specify)

12. What did you expect to get from the course?

____

____

____

13. Were these expectations met?

___fully

___partially

___somewhat

___not at all

(Scale must be completed for each expectation) [go to No. 15]

14. What would you expect to get from a course like St. John's, were you to take it?

____

____

____

[go to No. 19]

15. How much did the course increase your knowledge of first aid?

____very much ____a little

____somewhat ____not at all

16. How effective do you think you would be in an emergency requiring first aid?

____Very effective

____Quite effective

____Somewhat effective

____Ineffective

17. Do you consider yourself to be more capable of handling emergencies now, than before you took the course?

____much more capable

____more capable

____about the same

____less capable

18. Did the course teach you anything other than actual first aid treatment?

A. ___No [go to No. 23]

B. ___Yes

What? ____

____

[go to No. 23]

19. How effective do you think you would be in an emergency requiring first aid?

____very effective

____quite effective

____somewhat effective

____ineffective

20. Do you wear gloves when working with things that could injure your hands?

A. ___No

Why not? ____________________

B. ___Yes

Why? ____________________

21. Do you wear safety glasses when working in an eye hazard area?

A. ___No

Why not? ____________________

B. ___Yes

Why? ____________________

22. Do you wear a safety belt when driving or riding in a car?

___No

Why not? ____________________

___Yes

Why? ____________________

___Sometimes

When? ____________________

[go to No. 28]

23. Are you a more careful worker since taking the first aid course; that is, do you take greater safety precautions while working?

___much more careful

___more careful

___about the same

___less careful

___I always was careful

IF more careful--what safety precautions do you take now that you didn't take before the course?

____

____

24. Do you wear gloves when working with materials that could injure your hands?

A. ___No

___Why not? ______________________________

____

25. Do you wear safety glasses when working in an eye hazard area?

A. ____ No

____Why not? ______________________________

____

B. ____ Yes

Why? ______________________________

____

Did you wear them before taking the course?

____Yes ____No

26. Are you a more careful person since taking the course in your off-the-job activities?

____much more careful

____more careful

____about the same

____I always was careful

IF more careful--what safety precautions do you take now that you didn't take before the course?

____

____

27. Do you wear a safety belt when driving or riding in a car?

___No

Why not? ______________________________

____Yes

Why? ____________________

____Sometimes

When? ____________________

Did you wear a safety belt before taking the course?

_____Yes

_____No

Why not? ____________________

_____Sometimes

When? ____________________

[go to No. 31]

28. Has anyone that you know taken this course?

A. _____No [go to No. 46]

B. _____Yes [go to No. 29]

29. Have they become more safety conscious while working?

____much more careful

____more careful

____about the same

____less careful

IF more careful--what safety precautions do they take now that they didn't take before the course?

____

____

30. Have they become more safety conscious off-the-job?

_____much more careful

_____more careful

_____about the same

_____less careful

IF more careful--what safety precautions do they take now that they didn't take before the course?

____

____

[go to No. 46]

31. Have other people you know, who have taken the course, become more careful and safety conscious while working?

____much more careful

____more careful

____about the same

____less careful

IF more careful--what safety precautions do they now take that they didn't take before the course?

____

____

32. Have other people you know, who have taken the course, become more careful in their off-the-job activities?

____much more careful

____more careful

____about the same

____less careful

IF more careful--what safety precautions do they now take that they didn't take before the course?

____

____

33. Was the course interesting?

A. ____Yes

B. ____No

Why not? ____

34. Was the course worthwhile?

A. ___Yes

B. ___No

Why not? ____

35. Was the course relevant to your needs?

A. ___Yes

B. ___No

Why not? ____

36. Was the course too difficult, too easy or just about right in level of difficulty?

___too easy

in what way ____

___too difficult

in what way ____

___about right

37. Did the course contain too much detail, not enough detail or just about the right amount of detail?

____too much

what should be deleted ________________________________

____too little

what should be expanded ________________________________

____about right

38. Was the course too long, too short or just about the right length?

_____too long

what should be deleted

_____too short

what should be expanded

_____about right

39. Was the course reasonably priced?

A. ____Yes

B. ____No

C. ____company paid.

Would you have taken the course had the company not paid for it?

____yes ______no

40. Did costs other than course fees make the course too expensive?

A. ____No

B. ____Yes

What

_____babysitting _____lost time

_____transportation _____other_____________________________
(Specify)

41. Do you have any other comments, either critical or constructive, about the course?

____

____

____

____

42. What do you think could be done to improve the course?

____

____

____

____

43. How much of the course content do you remember?

_____less than 1/4

_____more than 1/4 but less than 1/2

_____more than 1/2 but less than 3/4

_____more than 3/4

44. Do you plan to take a refresher course?

A. _____no

B. _____yes

When? ____

45. What were the five most important things you learned in the first aid course? List as many as you can remember.

1. ____

____

2. ____

____

3. ____

____

4. ____

____

5. ____

____

[go to No. 48]

46. Have you ever had occasion to use first aid?

A. ____Yes

How often? ____________________

Where? ____________________

(e.g. home, highway, work, etc.)

Describe incident: (include (1) Apparent cause of accident or injury; (2) who else was present; (3) what aid was given; (4) if further medical aid was necessary) ____________________

____

____

____

____

B. ____No

How likely is it that you will have to administer first aid in the future?

____very likely

____quite likely

____possible

____doubtful

47. Have there been occasions when you felt that first aid training would have been useful?

A. ____Yes

How often? ____________________

Where? ____________________

(e.g. home, highway, work, etc.)

Describe incident(s) (include (1) nature of injury or accident; (2) who else was present; (3) what aid was given; (4) if further medical aid was necessary)

____

____

____

____

B. ____No

Why not? ____

____

____

____

[go to No. 50]

48. Have you ever had occasion to use first aid training since taking the course?

A. ____Yes

How often ____

Where ____

(e.g., home, highway, work, accident, etc.)

How effective was your treatment? (Complete the scale for each incident).

_____very effective

_____quite effective

_____somewhat effective

_____ineffective

Describe incident(s) (include: (1) Apparant cause of accident or injury (2) who else was present; (3) what aid was given; (4) if further medical aid was necessary) ____

____

____

B. ____No

How likely is it that you will have to use your first aid training in the near future?

_____very likely

_____quite likely

_____possible

_____doubtful

49. Were there any occasions before you took the course where first aid training would have been useful?

A. ____Yes

How often? ______________________________

When? ______________________________

(e.g.,home, highway, accident, work, etc.)

How effective was your treatment? (Complete the scale for each incident).

____very effective

____quite effective

____somewhat effective

____ineffective

Describe incident(s) (include: (1) apparant cause of accident or injury; (2) who else was present; (3) what aid was given; (4) further medical aid).

____

____

How likely is it that you will have to use your first aid training again?

____very likely

____quite likely

____possible

____doubtful

B. ____No

How likely is it that you will have to use your first aid training in the future?

___very likely

___quite likely

___possible

___doubtful

50. Compared to your impression of the average member of the community, how competent would you feel if faced with a first aid emergency?

_____well above average

_____above average

_____about average

_____below average

51. Do you know of anyone else who has had occasion to use first aid training?

A. ____No

B. ____Yes

Who (name, address, telephone, etc.)

____

____

____

How often ______________________________

Where ______________________________

(e.g., home, highway, accident, work, etc.)

How effective do you feel the treatment that they gave was? (Complete the scale for each incident).

_____very effective

_____quite effective

_____somewhat effective

_____ineffective

Describe incident(s) (include: (1) apparant cause of accident or injury; (2) who else was present; (3) what aid was given; (4) further medical aid).

____

____

How likely is it that they will have to use their first aid training again?

____very likely

____quite likely

____possible

____doubtful

52. Have you encouraged others to take a St. John training course?

A. _____Yes

Who (family, friends, etc.) ______________________________

____

Why ______________________________

B. _____No

Why not ______________________________

53. Have you ever either formally or informally, instructed others in aspects of first aid? (includes family members).

A. _____No

Why not ______________________________

B. _____Yes

Who ______________________________

Why ______________________________

54. Do you have a first aid kit?

A. _____No

B. _____Yes

Where?

_____boat ____home _____cottage

_____car ____work _____other ____________ (Specify)

55. Do you still have a first aid manual?

A. ____No

B. ____Yes

Where do you keep it?

_____boat _______home _____cottage

_____car _______work _____other____________ (Specify)

56. Do you have any additional comments? ______________________________

Time interview ends ______________________________

Length of interview ______________________________

Thank you for your time. Your information will be valuable in evaluating the success of the St. John first aid training programme. All answers will remain confidential.

Table A

On and Off the Job Safety Precautions, 1971 Sample

"What safety precautions do you take now that you didn't take before the course?"	GROUP I	GROUP II	GROUP III	TOTAL
ON JOB				
Wearing of safety glasses	1	1	1	3
Keeping poisons out of reach	1	0	0	1
General awareness	14	9	22	55
Protection of hands	2	0	0	2
Care on ladders	1	0	1	2
Keeping floors clean	1	0	1	2
Keeping tools clean	1	0	0	1
First aid kit checks	1	1	1	3
Wearing of hard hat	1	0	0	1
Wearing short sleeves	0	1	0	1
Moving obstacles out of way	0	3	1	4
OFF JOB				
General awareness	21	19	20	60
Home obstacles - stairs	2	6	6	14
Boating safety	1	1	2	4
Snowmobiling safety	1	1	2	4
Driving care	3	4	3	10
Swimming safety	1	1	3	5
Protection of children	2	3	4	9
Keeping drugs & pills locked up	1	4	1	6
Safety in kitchen	1	2	0	3
Care with lawnmowers	2	1	2	5

APPENDIX 6

PLAN OF THE PROJECT

The project at Factory A developed from information available from Canada. At this time only the preliminary report of FACTS I (*op cit*) was available and this did not provide many details of the training used and other important aspects. At the end of the project at Factory A the final report from FACTS I (*op cit*) and information about FACTS II became available. A comparison of results indicated a far greater effect on injury accident rates in the Canadian industries than at Factory A. There were at least three possible reasons for this difference. Firstly, the training at Factory A had been inadequate secondly, the research techniques used at Factory A were not sensitive enough to detect changes, thirdly the Canadian training included a variable or variables besides first aid training.

Four major differences were found between FACTS I and II and the study at Factory A. They were as follows:

(1) The Canadian training was longer comprising a mixture of 8 and 16 hour courses.

(2) The Canadian training contained a strong safety orientation and included discussion of causes of accidents as well as effects.

(3) Widespread propaganda was used in the Canadian studies relating first aid training to safety and invoking civic pride as a motivation to be safe.

(4) There were cultural differences between Canada and Britain, particularly in medical care and compensation for injury.

Training at Factory A consisted of a four hour course. However, cost and disruption of production meant that it was not possible to lengthen the first aid courses provided. The cultural differences between Canada and Britain were unavoidable. The St. John Ambulance were not willing to introduce safety into the first aid training, and this would in any case have altered the basic hypothesis, which was to test the effect of *first aid* training on accidents. Studies were however set up to investigate the effect of the other two differences.

'Cause and effect' examples were developed for inclusion in the training used at Factory B. At Factory C, first aid propaganda in the form of posters was used in conjunction with the training.

Although both factories agreed to take part in the project at the same time, for reasons of interview and training resources it was necessary to stagger the projects, Factory B starting before Factory C.

Problems had been noted during the training sessions at Factory A and as a result, 'objective cards' were developed to help the instructors. The 'objective cards' outlined the areas to be covered in each session and suggested how much time should be allocated to each topic. From experience gained at Factory A the first aid training course was developed to avoid similar problems arising in further training sessions.

The interview schedule was rewritten in the light of the findings from Factory A. Some questions were omitted and others added to investigate important areas in more detail. The rewritten schedule was piloted in two further factories before being used at Factories B and C. It was not possible to improve the collection of the injury accident data as accuracy of this depended largely on reporting rates and efficiency of the recording system.

Following training at Factory B it was evident that improvements were still necessary in the content and presentation of the first aid course. Thus, a new four hour course was devised for use at Factory C. Detailed instructors' notes were produced, clearly indicating which treatments should be taught and in how much detail. From these, new 'objective cards' were produced. The training given to instructors for Factory C was also extended.

The same experimental design was used at each factory, with slight modifications at Factories B and C to allow for the inclusion of 'cause and effect' examples and the first aid propaganda. The basic stages of the studies were as follows:-

(a) Advertising the courses.
(b) Matching volunteers with employees who did not volunteer.
(c) Selection of pre-training interviewees.
(d) Pre-training interviews.
(e) First aid training.
(f) Selection of post-training interviewees.
(g) Post-training interviews.
(h) Collection of injury accident data.

APPENDIX 7

FACTORY A - PRE-TRAINING INTERVIEW SCHEDULE

1. (a) Have you ever had any first aid training?

if yes (b) By whom?

(c) When

(d) What did you think of the training?

(e) Do you feel competent to carry out first aid?

if no (f) Had you ever thought about learning first aid before this present course?

if yes (g) Why didn't you?

VOLUNTEERS ONLY

2. What do you hope to gain from this course?

NON-VOLUNTEERS ONLY

(a) Did you think of volunteering for this course?

if yes (b) Why did you decide not to go on it?

3. How well do you think you could deal with a serious injury? (Scale)

4. (a) Have you ever carried out first aid on anyone?

if yes (b) How good do you think your treatment was? (Scale)

(c) How did you feel when you saw the accident?

(d) Have you ever seen an accident happen?

if yes (e) How did you feel when you saw it?

(f) What did you do?

if nothing (g) Was there anything you could have done?

5. Whose responsibility is it to know first aid?

6. (a) Have you ever had a serious injury?

if yes (b) Why do you think it happened?

(c) How could it have been prevented?

(d) Who treated you?

(e) Have you had any other serious injuries? (List)

if no (f) What is the worst injury you have had?

7. When someone is badly injured there are several unpleasant things about it. Here is a list of some. If you were badly injured which of these would worry you most?

(a) Pain

(b) Waiting in casualty

(c) Being in hospital

(d) Being off work

(e) Loss of earnings

(f) Effect on family

(g) Being scarred

(h) Being paralysed

(i) Permanent damage

8. Which types of injury would you least like to have?

9. (a) Which parts of your body would you least like to injure?

(b) Do you make any special efforts to protect these areas?

10. (a) When did you last hurt yourself at work?

(b) Did you know before it happened that you could get hurt like that?

(c) In general can you tell beforehand that an accident is likely to happen?

11. (a) Would you say you were safety conscious?

if yes (b) In what ways?

12. (a) How dangerous do you think your job is? (Scale)

If above half way

(b) Does this concern you?

(c) Would you rather do a safer job?

13. (a) How is it possible to hurt yourself on your job?

(b) How likely is that to happen? (Scale)

14. (a) How many of the injuries in this factory do you think could reasonably be prevented? (Scale)

(b) Have you any ideas about how this could be done?

15. How important do you think machine guarding is in preventing injuries (Scale)

16. How well do you think the dangerous parts of your machine are guarded? (Scale)

17. (a) Is it possible for you to remove the guards?

if yes (b) What happens if you do?

18. (a) Do you ever have to operate the machine with the dangerous parts unguarded?

if yes (b) How do you feel about doing it?

19. Does guarding affect your work rate in any way?

20. (a) Are you provided with any protective equipment or clothing?

if yes (b) How much do you use it?

(c) Is it comfortable?

(d) Does it interfere with your work?

(e) Does it do what it's supposed to?

(f) How could it be improved?

21. Do you need any more protective equipment or clothing?

22. Do you need eye protection for your job?

23. (a) When did you last hurt yourself at home?

(b) Could it have been prevented?

24. What first aid equipment do you have at home?

<u>If Driver</u>

25. (a) How safe a driver do you think you are? (Scale)

(b) What could be done to cut down the risk of you having an accident on the road?

<u>If Applicable</u>

26. (a) Do you wear a seat belt while in the car?

if yes (b) On what type of journeys?

(c) How long have you used one?

(d) Why did you start to use one?

if no (e) Why not?

27. What parts of first aid do you think should be known by everybody?

SCALES USED ON THE PRE-TRAINING INTERVIEW SCHEDULE AT FACTORY A

Each scale was presented to respondents on a separate card. The number refers to the question number on the pre-training interview schedule.

3.

VERY WELL ADEQUATELY BADLY

EXCELLENTLY QUITE WELL NOT VERY WELL NOT AT ALL

4(b).

BAD ADEQUATE VERY GOOD

USELESS NOT VERY GOOD QUITE GOOD EXCELLENT

7. a) PAIN
   b) WAITING IN CASUALTY
   c) BEING IN HOSPITAL
   d) BEING OFF WORK
   e) LOSS OF EARNINGS
   f) EFFECT ON FAMILY
   g) BEING SCARRED
   h) BEING PARALYSED
   i) PERMANENT DAMAGE

12(a).

VERY SAFE QUITE SAFE NOT VERY DANGEROUS QUITE DANGEROUS VERY DANGEROUS

13(b).

VERY UNLIKELY UNLIKELY NOT VERY LIKELY QUITE LIKELY VERY LIKELY

14(a).

NONE VERY FEW SOME QUITE A FEW MOST ALL

15.

USELESS NOT VERY IMPORTANT IMPORTANT VERY IMPORTANT ESSENTIAL

16.

EXCELLENTLY VERY WELL QUITE WELL ADEQUATELY NOT VERY WELL BADLY NOT AT ALL

25(a).

VERY SAFE QUITE SAFE NOT VERY DANGEROUS QUITE DANGEROUS VERY DANGEROUS

APPENDIX 8

FACTORY A - POST-TRAINING INTERVIEW SCHEDULE

VOLUNTEERS ONLY

1. Did you find the course:-

(a) Interesting?

(b) Worthwhile?

(c) Relevant to your needs?

(d) Too difficult or easy?

(e) Had too much/little detail?

VOLUNTEERS ONLY

2. (a) Did you get what you wanted from the course?

if no (b) What else did you want?

VOLUNTEERS ONLY

3. Could you indicate how much you think your knowledge of first aid has increased following the course? (Scale)

VOLUNTEERS ONLY

4. (a) Would you encourage other people to take the course?

if yes (b) Have you done?

VOLUNTEERS ONLY

5. (a) Have you told anybody how to do any first aid since the course?

if yes (b) Who?

VOLUNTEERS ONLY

6. (a) Would you like to take a refresher course some time in the future?

if yes (b) When do you think you would need one?

VOLUNTEERS ONLY

7. (a) Would you like to take a full first aid course at some time?

if yes (b) When would you like to?

VOLUNTEERS ONLY

8. (a) Has the course changed any of your ideas?

if yes (b) How?

VOLUNTEERS ONLY

9. Has the course affected:-

(a) The way you work?)
(b) The way you drive?) If yes - how?
(c) Your time at home?)

VOLUNTEERS ONLY

10. (a) Did you learn anything other than first aid from the course?

if yes (b) What?

VOLUNTEERS ONLY

11. What do you think could be done to improve the course?

VOLUNTEERS ONLY

12. If you never needed to use your first aid training would this course still have been of use to you?

13. (a) Do you feel more secure now that a lot of your work mates know first aid?

if yes (b) In what way?

(c) Would you prefer more of them to be trained or less?

VOLUNTEERS ONLY

14. How likely do you think you are to use your first aid knowledge? (Scale)

15. (a) How well do you think you could deal with a serious injury? (Scale)

VOLUNTEERS ONLY

(b) How much better could you cope now than before your training? (Scale)

16. (a) Have you carried out first aid on anyone in the last three months?

if yes (b) How good do you think your treatment was? (Scale)

VOLUNTEERS ONLY

(c) Could you have coped as well before your training?

all (d) How did you feel when you saw the accident?

(if no to 16 (a))

(e) Have you seen an accident happen in the last three months?

if yes (f) How did you feel when you saw it?

(g) Was there anything you could have done to help?

17. Who do you think ought to know first aid?

18. (a) Have you had an injury in the last three months?

if yes (b) Was it serious?

(c) Where did it happen?

Home/Road/Work/Leisure

(d) What was the injury?

(e) Could you have done anything to prevent it?

(f) Could anyone else have prevented it?

(g) Have you had any other injuries in that time?

19. If you were seriously injured which two or three of this list would worry you most?

The pain

Being in hospital

Physical damage

Being off work

Effect on family

Loss of activity

20. Which of this list of types of injury would you least like to have? Choose two or three.

Blindness

Fractures

Burns

Paralysis

Amputation

Internal injuries

Brain damage

21. Which of this list of parts of your body would you least like to injure? Choose two or three.

Head

Arms

Hands

Legs

Back

Eyes

Internal organs

Face

22. How dangerous do you think your job is? (Scale)

23. (a) How likely are you to get hurt doing your job? (Scale)

(b) What type of injury would that be?

(c) Would that be a serious injury?

24. (a) How many of the accidents in this factory do you think could reasonably be prevented? (Scale)

(b) Who could do most to reduce the number of accidents? (Scale)

25. How well do you think the dangerous parts of your machine are guarded? (Scale)

26. Does guarding affect your work rate in any way?

27. (a) Are you provided with:

(i) eye protection and/or

(ii) hand protection?

if yes (b) Please indicate in relative columns how much of the time you use them.

(c) Does it interfere with your work? (Hand and/or eye)

(d) Does it do the job it's supposed to? (Hand and/or eye)

28. (a) Do you have a first aid box at home or in the car?

(b) Have you bought any first aid equipment since the course?

if yes (c) Was there any special reason why you bought it or was it just a replacement?

VOLUNTEERS ONLY

29 (a) Did you have a first aid manual before taking the course?

NON-VOLUNTEERS ONLY

(a) Do you have a first aid manual?

VOLUNTEERS ONLY

(b) Do you still have your 'Digest of First Aid'?

BOTH GROUPS

if yes (c) Do you ever read it now?

30. (a) How safe a driver do you think you are compared with the others on the road? (Scale)

(b) Is there anything you could do to cut down the risk of your having an accident on the road?

(c) Is there anything anyone else could do?

31. (a) How much of the time do you wear your seat belt: (Scale)

if applicable

(b) Have you started to wear one more in the last three months?

if yes (c) Why?

32. What do you think are the most important first aid treatments that should be known by everybody?

SCALES USED ON THE POST-TRAINING INTERVIEW SCHEDULE AT FACTORY A.

Each scale was presented to respondents on a separate sheet of paper. The number refers to the question number on the post-training interview schedule.

3.

VERY MUCH | QUITE A LOT | A LITTLE | NOT AT ALL

14.

VERY LIKELY | QUITE LIKELY | NOT VERY LIKELY | UNLIKELY

15(a).

NOT AT ALL | BADLY | NOT VERY WELL | ADEQUATELY | QUITE WELL | VERY WELL | EXCELLENTLY

15(b).

VERY MUCH BETTER | MUCH BETTER | SLIGHTLY BETTER | ABOUT THE SAME

16(b).

USELESS | BAD | NOT VERY GOOD | ADEQUATE | QUITE GOOD | VERY GOOD | EXCELLENT

19. a) THE PAIN
b) BEING IN HOSPITAL
c) PHYSICAL DAMAGE
d) BEING OFF WORK
e) THE EFFECT ON YOUR FAMILY
f) LOSS OF ACTIVITY

20. BLINDNESS
FRACTURES
BURNS
PARALYSIS
AMPUTATION
INTERNAL INJURIES
BRAIN DAMAGE
OTHERS

21. HEAD
ARMS
HANDS
LEGS
OTHERS
BACK
EYES
INTERNAL ORGANS
FACE

22.

VERY SAFE	QUITE SAFE	NOT VERY DANGEROUS	QUITE DANGEROUS	VERY DANGEROUS

23(a).

VERY LIKELY	QUITE LIKELY	NOT VERY LIKELY	UNLIKELY	VERY UNLIKELY

24(a).

NONE	VERY FEW	SOME	QUITE A FEW	MOST	ALL

24(b). THE MANAGEMENT
SUPERVISION
THE INDIVIDUAL WORKER
THE UNIONS

25.

EXCELLENTLY	VERY WELL	QUITE WELL	ADEQUATELY	NOT VERY WELL	BADLY

27(b).

	EYE PROTECTION	HAND PROTECTION
ALL THE TIME NECESSARY		
MOST OF THE TIME NECESSARY		
SOMETIMES WHEN NECESSARY		
NOT VERY OFTEN		
NEVER		

30(a).

MUCH BETTER THAN AVERAGE	BETTER THAN AVERAGE	AVERAGE

31(a).

NEVER	NOT VERY OFTEN	SOMETIMES	ON LONG JOURNEYS ONLY	MOST OF THE TIME	ALL THE TIME

APPENDIX 9

DEVELOPMENT OF WEIGHTINGS FOR RESPONSES TO THE QUESTIONS INVESTIGATING THE RATED SEVERITY OF TYPES AND AREAS OF INJURY

At all three factories two questions were asked, pre- and post-training, which attempted to measure interviewees' perception of the severity of injury. Pre-training at Factory A respondents were asked which type(s) of injury they would least like to suffer and which area(s) of their body they would least like to injure. Post-training respondents were shown one list of types of injury and another list of areas of the body. In each case they were asked to select the three they thought were the worst and then to rank their three choices in order. This change in form of the question from open-ended to forced-choice questions was made because of the need to develop the interview schedule for future studies. For pre- and post-training interviews at Factories B and C the forced-choice question was used. Follow-up questions asked respondents why they had selected their first choices.

Major changes in responses seemed to have occurred at Factory A (see Chapter 11), although these might have been the result of the change in the form of the question. In my opinion the changes in responses of the volunteers following training appeared to indicate that they had developed a greater awareness of the severity of different types of injury and of injuries to different parts of the body. However, no objective ranking of severity existed with which to confirm my opinion. Ideally, a numerical value was required corresponding to the severity of each type of injury and each area of injury so that the changes in response of the volunteers could be measured.

In order to give a numerical value to the items on the lists it was necessary to use a standard measurement. However, no standard measure of severity existed (Baughan, 1975; Green and Brown, 1977)*. The most appropriate way of creating a standard seemed to be to select an appropriate group of experts and ask them to rank the types and areas of injury in order to severity. I decided that the most appropriate group of experts who could produce a combined rating was occupational health nurses. This was because they have experience of the effects of various injuries on workers, from the time of the original injury until complete recovery.

It was recognised that the group of nurses used might not be totally consistent in their ratings of severity because they might use different ranking criteria. However, the purpose of this study was simply to provide some standard with which to compare the responses of the factory respondents. The numbers and rankings created were not intended to be important in themselves. They would only be relevant to this study and their use would be limited to the interpretation of any measured changes in response of the groups.

METHOD

Eighteen occupational health nurses were presented with the lists shown in Figures A and B. The types and areas of injury listed were those which were used at Factories B and C (and were similar to those used post-training at Factory A). The nurses were asked to rank the types of injury and parts of the body from 1 to 7, with 1 indicating the most severe type of injury or worst area to injure. They were then left to complete the ranking.

*Personal communication with these authors took place prior to their reports becoming available.

FIGURE A

Please rank (from 1 to 7) the following types of injury in terms of severity.

e.g. If you think a fracture is the injury which is the most severe, put 1 in the box opposite 'fracture'.

(a)	AMPUTATION	☐
(b)	INTERNAL INJURY	☐
(c)	EYE DAMAGE	☐
(d)	FRACTURE	☐
(e)	HEAD INJURY	☐
(f)	EXTENSIVE BURNS	☐
(g)	PARALYSIS	☐

FIGURE B

Please rank (from 1 to 7) the following parts of the body in terms of the severity of injury to that part.

e.g. If you think a back injury is the most severe, put 1 in the box opposite 'back'.

(a)	HAND	☐
(b)	BACK	☐
(c)	FACE	☐
(d)	HEAD	☐
(e)	LEG	☐
(f)	EYE	☐
(g)	INTERNAL ORGAN	☐

All satisfactorily completed lists were collected and the mean rank scores calculated. From these scores weightings were calculated for the types and areas of injury. For type of injury there were 17 completed lists and for area of injury, 15 completed lists.

RESULTS

Table B shows the occupational health nurses' rankings of the severity of types of injury and areas of injury, together with the mean rank values.

The rankings indicate that there was a reasonable amount of agreement among the group of nurses but that on certain items there was a considerable range from the highest to the lowest rank, for example three nurses ranked paralysis as the most severe type of injury and one nurse ranked it as the least severe type of injury. Ideally there would have been little variation between the ranks of each of the items but it was clear that a range of views existed. Despite this, the mean rank values provided an acceptable measure of the group of nurses' rankings of severity. Furthermore, the numerical values obtained gave a more accurate measure of the interval between items of the list than a simple ranking from 1 to 7. For example, it was clear that the nurses agreed on the severity of hand, head and eye injuries, but that they were not able to separate back and internal organ, or face and leg in terms of severity. This was reflected in the mean rank value. Similarly the nurses did not clearly differentiate the severity of internal injuries, extensive burns and paralysis but were reasonably clear in their judgement of the severity of amputation, eye damage, fracture, and head injury.

TABLE B

OCCUPATIONAL HEALTH NURSES' RANKINGS OF SEVERITY OF TYPES AND AREAS OF INJURY

TYPE OF INJURY	RANKING							MEAN RANK
	1	2	3	4	5	6	7	
AMPUTATION	-	-	3	9	1	3	1	4.41
INTERNAL INJURY	3	4	2	1	6	1	-	3.35
EYE DAMAGE	-	-	-	5	3	8	1	5.29
FRACTURE	-	-	-	-	1	3	13	6.71
HEAD INJURY	7	7	3	-	-	-	-	1.76
EXTENSIVE BURNS	4	1	8	1	1	2	-	3.00
PARALYSIS	3	5	1	2	5	-	1	3.29

AREA OF INJURY	RANKING							MEAN RANK
	1	2	3	4	5	6	7	
HAND	-	-	-	-	3	4	8	6.33
BACK	1	6	2	4	1	1	-	3.07
FACE	-	-	1	2	3	6	3	5.53
HEAD	9	5	-	1	-	-	-	1.53
LEG	-	-	-	2	6	4	3	5.53
EYE	1	4	6	3	1	-	-	2.93
INTERNAL ORGAN	3	2	5	3	1	-	1	3.07

The resulting rank orders could most reasonably be expressed as:

Type of injury

(1) head injury

(3) extensive burns, paralysis, internal injury

(5) amputation

(6) eye damage

(7) fracture

Area of injury

(1) head

(2) eye

(3.5) back and internal organ

(5.5) face and leg

(7) hand

These obtained rank orders corresponded closely with my own subjective orders of severity. It is again necessary to stress that these rank orders are far from being a definitive ordering of severity but that they were a reasonable standard with which to compare the responses of the respondents at the factories.

As stated above, respondents were asked to select three items from each list and then to rank those three choices in order. To produce a score for each respondent, it was necessary to further weight the nurses' mean rank value in terms of whether the item was placed first, second or third. For this purpose it was assumed that the remaining four items had been given a value of 0 by the respondents, that is they had not been ranked, as severe injuries.

The mean rank value for each item was subtracted from 8 to give the most severe type or area of injury the highest score (allowing a maximum scroe of 7 and a minimim score of 1). For example, head injury was given the value of 6.24 (8 - 1.76), and fracture was given the value 1.29 (8 - 6.71). It was not possible to determine the actual subjective distance between first, second and third choices and therefore each score was multiplied by 0.5 for the first choice, 0.33 for the second choice, and 0.16 for the third choice.* It was recognised that respondents might not have differentiated that clearly between their three choices but again the numbers obtained were being used as an aid to interpretation of changes in response, not as absolute measures. The resulting weighted scores are shown in Table C.

Using the weighted scores it was possible to produce a score for any combination of three types or areas of injury. For example, if a respondent had ranked head injury first, internal injury second, and burns third, his score would be 3.12 + 1.55 + 0.83 = 5.5. The higher his score the closer was his agreement with the rankings of the occupational health nurses. By totalling the scores of each respondent in each group it was possible to test the mean score of the volunteers' and non-volunteers' responses pre- and post-training, and also to test whether there was a change in the mean score of the volunteers and non-volunteers between pre- and post-training.

*This method of weighting was selected following discussions with statisticians.

TABLE C

WEIGHTED SCORES USED FOR ANALYSING RESPONDENTS' RANKINGS OF TYPES AND AREAS OF INJURY

TYPE OF INJURY	FIRST CHOICE	SECOND CHOICE	THIRD CHOICE	TOTAL
AMPUTATION	1.80	1.20	0.60	3.60
INTERNAL INJURY	2.33	1.55	0.78	4.66
EYE DAMAGE	1.36	0.90	0.45	2.71
FRACTURE	0.65	0.43	0.22	1.30
HEAD INJURY	3.12	2.08	1.04	6.24
EXTENSIVE BURNS	2.50	1.67	0.83	5.00
PARALYSIS	2.36	1.57	0.79	4.72

HIGHEST POSSIBLE SCORE = 5.58
LOWEST POSSIBLE SCORE = 2.15

AREA OF INJURY	FIRST CHOICE	SECOND CHOICE	THIRD CHOICE	TOTAL
HAND	0.84	0.56	0.28	1.68
BACK	2.47	1.64	0.82	4.93
FACE	1.24	0.82	0.41	2.47
HEAD	3.24	2.16	1.08	6.48
LEG	1.24	0.82	0.41	2.47
EYE	2.54	1.69	0.85	5.08
INTERNAL ORGAN	2.47	1.64	0.82	4.93

HIGHEST POSSIBLE SCORE = 5.75
LOWEST POSSIBLE SCORE = 2.07

DISCUSSION

It was predicted that the mean score of the non-volunteers would remain the same pre- and post-training, and that that of the volunteers would increase. It was hypothesised that such an increase in mean score would indicate that the volunteers had a clearer idea of the severity of the types of injury and/or the areas of injury, and that they would consequently be more motivated to avoid being injured.

The technique developed above cannot be considered to be a satisfactory general measure of the severity of injuries. Many different factors might have influenced the rankings of the occupational health nurses. The range of the rankings for certain items indicated that the nurses expressed a range of views, as any group might be expected to. To overcome this problem, respondents in the factory studies were asked why they had selected their first choice of the worse type of injury and the worst part of the body to injure. It was hypothesised that post-training the volunteers would answer this question relatively more often with answers concerned with the severity of the injury and relatively less with reference to other aspects such as disfigurement or not being able to see what was wrong. Another drawback of the method was that the categories were not mutually exclusive, for example both head and back injuries can cause paralysis. Another problem was that of equating types of injury when the extent of the injury was not specified. With this in mind, respondents at the factories were informed that the items on the lists were all serious.

Despite the problems I felt that the weightings developed made a better comparison measure for the responses of the interviewees, than my own subjective order of severity, or than a system that allocated 7 marks to the most severe item, 6 marks for the next and so on. The latter system would have created artificially large differences between items which the nurses ranked of equal or nearly equal severity. The weightings also conferred another advantage in that they allowed statistical analysis. Significant changes in the group's mean score would indicate that changes in response had occurred, but the interpretation of those changes would be made by looking at the actual responses and not the developed scores. The occupational health nurses questionnaire was part of the developing action research project. The results of the numerical analysis were necessarily treated with caution.

APPENDIX 10

EXTRACT FROM THE BRIEFING NOTES AT FACTORY A

The Company has just agreed to participate with the St. John Ambulance Brigade and the University of Aston in a project designed to investigate the effects of an awareness of First Aid.

A similar experiment has been carried out in Canada with noted success. Factory A will be the first Company in the U.K. to undertake this type of project.*

Full details will be issued during the next few weeks, but in general terms, a cross-section of employees will be invited to attend First Aid classes to be held on site at Aldridge. The training will be followed up and monitored throughout by the Safety and Hygiene Department of the University, and the results will be published on a national basis.

* 'Factory A' has been inserted in place of the actual name of the company.

APPENDIX 11

THE MULTI-CHOICE QUESTIONNAIRE USED AT FACTORY A

(ACCEPTABLE ANSWERS MARKED WITH AN ASTERISK)

1. You are giving mouth-mouth resuscitation and notice that the casualty's chest is not rising. The most likely reason for this is, because:-

   (a) The casualty is dead

* (b) There is an airway obstruction

* (c) You have not completely sealed your lips around his nose and mouth

   (d) The heart is not functioning effectively

2. A semi-recumbent position is usually the most comfortable for a casualty who:-

   (a) Has fainted

   (b) Suffered shock

* (c) Had an acute heart attack

   (d) Is unconscious

3. When administering mouth-mouth resuscitation to an adult person which of the following rates apply?

   (a) 6-8 breaths a minute

* (b) 10-12 breaths a minute

   (c) 12-14 breaths a minute

   (d) 14-16 breaths a minute

4. A person with a nose-bleed should be told to:-

   (a) Sit upright and apply pressure to bridge of nose

* (b) Lean forward and pinch soft part of nose

   (c) Bend over and exhale sharply through the nose

(d) Sit with head slightly forward and nostrils plugged

5. If you wished to apply pressure to a large wound, what would you do?

(a) Bandage the wound first

(b) Apply a ring pad

(c) Press the centre of the wound

* (d) Press the sides of the wound together

6. When applying pressure on the brachial pressure points the artery should be compressed with:-

(a) One thumb only

(b) Both thumbs

(c) Fingers and thumb of one hand

* (d) Fingers of one hand only

7. What is the greatest danger of an electric current passing through the body?

(a) Muscle spasm causing subsidiary injuries

* (b) Cardiac arrest

* (c) Asphyxia

(d) Severe burns

8. In the case of a heart attack the casualty should be placed in the:-

(a) Recumbent position

(b) Recovery position

* (c) Most comfortable position

* (d) Semi-recumbent position

9. There is one fundamental cause of established shock. Which is it?

* (a) Loss of blood and plasma
  (b) Fall of blood pressure
  (c) Sudden expansion of blood vessels causing relative loss of blood in the brain
  (d) Acute and prolonged pain

10. In the case of a major epilepsy, you should:-

  (a) Forcibly restrain the casualty for his own safety
* (b) Restrain him only as far as is necessary
  (c) Prise open his mouth to remove false teeth
  (d) Leave him alone until spasms cease

11. The <u>most important</u> aspect of treatment of burns (and scalds) is the:-

  (a) Prevention of infection
  (b) Relief of pain
* (c) Reduction of heat
  (d) Replacement of fluid loss

12. How would you treat a sprain?

  (a) Apply pressure bandage
* (b) Apply cold compresses
  (c) Treat as for fracture
  (d) Instruct casualty to exercise

13. A fracture of the base of the skull could be indicated by the discharge of a straw coloured liquid from the casualty's:

* (a) Ear
* (b) Nose
  (c) Mouth
  (d) Tear ducts

14. A casualty suffering from a fracture of the neck should be transported in:-

  (a) The recovery position
  (b) Face downwards position
* (c) Face upwards position
  (d) In semi-recumbent position but with head supported

15. A closed fracture is a:-

  (a) Fracture that has been bandaged correctly
* (b) Fracture where the skin is not broken
  (c) Fracture where there is internal bleeding
  (d) Fracture where there is no internal bleeding

ODD NUMBERED QUESTIONS WERE BASED ON THE COURSE

EVEN NUMBERED QUESTIONS WERE NOT BASED ON THE COURSE

APPENDIX 12

FACTORY A - PRE-TRAINING INTERVIEW RAW DATA

Question Number	Responses	Volunteers	Non-Volunteers
1(a)	YES	15	14
	NO	35	36
(b)	St. John Ambulance	4	2
	Forces	6	8
	Mines	2	3
	Home Guard	3	1
	School	3	-
	Factory	2	-
(c)	Not adequately answered		
(d)	Favourable	8	8
	Unfavourable	2	2
(e)	Competent	2	4
	Fairly competent	3	-
	Not competent	4	5
	Other	-	2
(f)	YES	18	6
	NO	24	28
(g)	Inconvenient/didn't have time	12	5
	Didn't know where to go	3	-
	Weak stomach/sight of blood	1	5
	Others	2	3
2	VOLUNTEERS ONLY		
	To help (general)	15	
	To help (at home)	3	
	To help (on the road)	6	
	To help (at the factory	3	
	To help (with football)	1	
	To increase knowledge	16	
	Accident prevention/causes of accidents	2	
	Because on safety committee	2	
	As a refresher course	3	
	Others	4	
	Time too short to gain much	2	
2	NON-VOLUNTEERS ONLY		
(a)	YES		5
	NO		39
	Didn't hear about it		8
(b)	No time		11
	Not interested		8
	Weak stomach		7
	Course too short		5
	Too old/ill		3
	Others		2
	No reason		4

Question Number	Responses	Volunteers	Non-Volunteers
3	Excellently	1	-
	Very well	2	2
	Quite well	10.5	3
	Adequately	12.5	18
	Not very well	20	24
	Badly	1.5	-
	Not at all	2.5	2
4(a)	YES	16	10
	NO	34	40
(b)	Excellent	2	-
	Very good	5	1
	Quite good	2	5.5
	Adequate	5	3.5
	Not very good	-	-
	Bad	-	-
	Useless	-	-
(c)	Normal	11	4
	Sick	2	5
(d)	YES	21	23
	NO	13	17
(e)	Normal	15	8
	Sick	6	14
(f)	Helped	4	5
	Nothing	5	1
	Nothing could do	2	5
(g)	Not answered adequately		
5	Everybody's	43	28
	Didn't say everybody's	7	22
6(a)	YES	17	13
	NO	33	37
	TYPES OF SERIOUS INJURY EXPERIENCED		
	Fractures	5	5
	Wounds	5	5
	Burns	2	2
	Amputation	1	1
	Others	4	-

Question Number	Responses	Volunteers	Non-Volunteers
6(b)	Others' fault	7	6
	Own fault	6	5
(c)	Could have been prevented	8	10
	Could not have been prevented	5	3
(d)	Not answered adequately		
(e)	OTHER SERIOUS INJURIES EXPERIENCED		
	Fractures	2	-
	Wounds	1	1
	Burns	1	1
	Amputation	-	-
	Others	3	2
(f)	TYPES OF NON-SERIOUS INJURIES EXPERIENCED		
	Fractures	6	10
	Cuts	11	6
	Burns	2	5
	Sprains	3	2
	Knocks and knock outs	4	2
	Amputations	2	1
	Others	2	7
	AREAS OF NON-SERIOUS INJURIES EXPERIENCED		
	Hand	8	6
	Leg(s)	5	7
	Head	7	7
	Others	5	7
	NUMBER REPORTING SERIOUS/WORST/NO ACCIDENTS		
	Serious	17	13
	Worst	27	30
	None	6	5
7	Pain	12	14
	Waiting in casualty	3	5
	Being in hospital	3	8
	Being off work	5	6
	Loss of earnings	8	10
	Effect on family	33	22
	Being scarred	3	5
	Being paralysed	21	30
	Permanent damage	33	30

Question Number	Responses	Volunteers	Non-Volunteers
8	Blindness	11	11
	Burns	11	4
	Fractures	3	3
	Brain damage	5	8
	Amputation	7	8
	Internal	6	5
	Paralysis	4	6
	Facial	2	-
	Others	-	3
9(a)	Eyes	31	22
	Head	5	12
	Hands	8	5
	Face	8	2
	Arms	6	6
	Legs	7	13
	Back	5	3
	Internal organs	6	3
	Ears	2	-
(b)	YES	34	25
	NO	7	12
	Not applicable	4	4
10(a)	In last month	7	7
	1 - 6 months ago	6	6
	6 -12 months ago	7	7
	Over 1 year ago	14	7
	Never	13	14
(b)	YES	13	14
	NO	22	17
(c)	YES	19	15
	NO	11	12
	Sometimes	6	6
11(a)	YES	48	45
	NO	2	3
(b)	Careful	27	29
	Foresee danger	10	5
	Use personal protection	8	6
	Concern for others	7	6
	Report danger	4	2

Question Number	Responses	Volunteers	Non-Volunteers
12(a)	Very safe	1	1
	Quite safe	13	16.5
	Not very dangerous	19	18
	Quite dangerous	10.5	7.5
	Very dangerous	1.5	1
(b)	Concerned	11	7
	Not concerned	1	1
(c)	YES	4	4
	NO	8	4
13(a)	Burns/Electric shock	24	25
	Slipping/falls	11	9
	Trapping/catching/cuts	18	21
	Metal flying/falling/foreign bodies in eye	18	15
	Lifting/pulling	4	1
	Others	9	1
(b)	Very likely	8	5
	Quite likely	14.5	10
	Not very likely	17.5	14
	Unlikely	3	8
	Very unlikely	5	7
14(a)	All	2	1
	Most	11	8
	Quite a few	17.5	12
	Some	9.5	16
	Very few	4	3
	None	1	2
(b)	RESPONSIBILITY ATTRIBUTED TO		
	Individual worker	25	22
	Supervisor	7	1
	Management	7	9
	Factory/equipment	7	6
	Piecework	3	2
	Personal protection	7	2
15	Essential	26	24
	Very important	14	15
	Important	2	-
	Not very important	-	-
	Useless	-	-

Question Number	Responses	Volunteers	Non-Volunteers
16	Excellently	1	6
	Very well	8	9
	Quite well	15	6
	Adequately	6	8
	Not very well	4	4
	Badly	-	2
	Not at all	-	-
17(a)	YES	21	22
	NO	7	4
(b)	Almost all machines cut out automatically		
18(a)	YES	11	13
	NO	19	14
	Not applicable	20	23
(b)	Not bothered	6	9
	Worried/cautious	3	2
19	YES	6	1
	NO	22	23
20(a)	YES	41	35
	NO	4	7
	<u>TYPES OF PERSONAL PROTECTION PROVIDED</u>		
	Gloves/hand rags	26	25
	Glasses/goggles/visors	29	17
	Clothing for body	19	11
	Helmet/hat	8	7
	Boots/shoes	8	4
	Masks	5	3
(b)	All the time	12	16
	Most of the time	11	5
	When necessary	12	6
	Sometimes	2	3
	Not very often	3	2
	Never	1	3
(c)	YES	26	14
	NO	16	18
(d)	YES	26	10
	NO	16	19
(e)	YES	35	29
	NO	3	1

Question Number	Responses	Volunteers	Non-Volunteers
20(f)	Gave ideas	12	13
	Didnot give an idea	23	15
21	YES	22	15
	NO	21	26
	<u>ITEMS SUGGESTED</u>		
	Boots	10	10
	Body protection	12	4
	Hats	2	2
	Goggles	2	1
	Gloves	-	1
22	YES	34	25
	NO	10	18
23(a)	Never	26	23
	Over 15 years ago	5	4
	1 - 15 years ago	8	11
	Less than 1 year ago	3	6
(b)	YES	9	11
	NO	2	4
24	Answers varied considerably. Analysed by whether or not they had a first aid box:		
	Mentioned first aid box	25	22
	Didn't mention first aid box	25	28
25(a)	<u>IF DRIVER</u>		
	Very safe	13.5	7
	Quite safe	23.5	23
	Not very dangerous	-	1
	Quite dangerous	-	-
	Very dangerous	-	-
(b)	Actions they could take	30	33
	Actions others could take	10	9
26(a)+(b)	All the time	12	17
	Most of the time	4	3
	Sometimes	3	1
	On long journeys	15	8
	Never	15	14

Question Number	Responses	Volunteers	Non-Volunteers
26(c)	Not adequately answered		
(d)	They were fitted	9	9
	Safer	6	5
	Publicity	7	8
	Because of accident	3	2
	Somebody insists on it	2	2
	Good idea	2	2
	Others (including two volunteers who claimed seat belts must be worn by law)	3	1
(e)	Uncomfortable	4	4
	Can't be bothered	1	7
	Don't think of it	3	1
	Could get trapped	5	2
	Not applicable	3	2
27	Serious bleeding	26	23
	Artificial respiration	15	9
	Electric shock	9	7
	Shock	6	7
	Recovery position/unconsciousness	7	5
	Major injuries	3	4
	General first aid	5	1
	What not to do/when not to move	4	6
	Choking/fits	1	3
	Burns	10	6
	Scalds	2	2
	Fractures	9	14
	Poisoning	1	-
	Collapse	1	2
	Drowning	2	2
	Stroke/heart attack	6	-
	Diabetes	1	-
	Minor cuts	2	3
	Bruises	3	1
	Fainting	4	2
	Nose bleeds/splinters/stings	5	-
	Slings/dressings/tourniquets	15	7
	Minor injuries	4	4
	<u>ANALYSIS BY MAJOR AREAS.</u>		
	Artificial respiration	32	18
	Bleeding	26	23
	Unconsciousness	7	5
	Shock	6	7
	Other answers	70	55
	<u>ANALYSIS BY WHETHER TREATMENTS INCLUDED ON COURSE</u>		
	On course	88	76
	Not on course	53	32

APPENDIX 13

FACTORY A - POST-TRAINING INTERVIEW RAW DATA

Question Number	Responses	Volunteers	Non-Volunteers
	(QUESTIONS 1 - 12, 14, 15b and 16c WERE FOR TRAINEES ONLY)		
1(a)	YES	46	
	NO	-	
	(Very interesting)	18	
	(Fairly interesting)	1	
	(Quite interesting)	1	
	(Reservedly)	1	
(b)	YES	44	
	NO	1	
	Debatable	1	
(c)	YES	39	
	NO	7	
(d)	All right	31	
	All right if had more time	3	
	Too difficult because time too short	4	
	Too difficult	2	
	Easy/too easy	6	
(e)	All right	24	
	All right for time available	4	
	Too much for time available	5	
	Too little	12	
	(50% of trainees mentioned that the course was too short (in time) or had too little detail because the time was limited).		
2(a)	YES	39	
	NO	7	
(b)	Various suggestions made including more on burns and bleeding, more practical work, a deeper understanding, start at a more simple level		
3	Very much	5	
	Quite a lot	20	
	A little	18	
	Not at all	3	
4(a)	YES	44	
	Would recommend a full course	1	
	Think should know some first aid first	1	
(b)	YES	23	
	NO	23	

Question Number	Responses	Volunteers	Non-Volunteers
5(a)	YES	24	
	NO	22	
(b)	Wife/husband	13	
	Children/other family	7	
	Work mates	5	
	Girl friend	1	
	Others	2	
6(a)	YES	40	
	NO	6	
(b)	Mean time suggested	6 months	
7(a)	YES*	31	
	NO	15	
(b)	*16 mentioned that finding time was a problem. 2 thought that the blood might bother them		
8(a)	YES	28	
	NO	18	
(b)	Learnt new treatments	8	
	Learnt first aid	5	
	Ability to help people	7	
	Awareness of injury	1	
	About accidents/safety	6	
	Others	4	
9(a)	YES	19	
	<u>REFERENCES MADE TO SAFETY</u>		
	More careful	11	
	More safety conscious	7	
	More conscious of danger	1	
	More conscious of safety equipment	1	
	NO	26	
	<u>REFERENCES MADE TO SAFETY</u>		
	Always been safety conscious	6	
	For a couple of days only	1	
	NOT APPLICABLE	1	

Question Number	Responses	Volunteers	Non-Volunteers
9(b)	YES	7	
	NO	30	
	Not applicable	7	
(c)	YES	12	
	NO	34	
	Answers given to how the course had affected their driving and time at home were similar to 9(a) answers		
10(a)	YES	19	
	NO	26	
	Don't know	1	
(b)	Number who referred to safety or accidents	6	
11	Longer time	23	
	More detail	11	
	Nothing	11	
	Other suggestions	15	
	Don't know	1	
12	YES	44	
	NO	1	
	Don't know	1	
	Most respondents stated that 'any knowledge is good', or 'don't know when you will need it', or 'have learnt what to do if needed'.		
	Number referring to safety or accidents	4	
13(a)	YES	27	17
	NO	15	24
	Not applicable	4	5
	MORE SECURE BECAUSE		
(b)	They could help if I had an accident	19	15
	They could help quickly	5	1
	They are more safety conscious/careful	3	-
	NOT MORE SECURE BECAUSE		
	They don't know enough	4	1
	Too many still untrained	1	-
	They are beginners	1	-
	Piecework makes them careless	1	-
	They thought the training was a skive	-	1

Question Number	Responses	Volunteers	Non-Volunteers
13(c)	More	35	26
	Less	-	1
	Right number now	2	3
	Other responses	9	16
14	Very likely	8	
	Quite likely	23	
	Not very likely	15	
	Unlikely	-	
15(a)	Excellently	-	-
	Very well	1	-
	Quite well	10	3
	Adequately	25	15.5
	Not very well	8	18.5
	Badly	1	4
	Not at all	1	5
(b)	Very much better	9	
	Much better	21	
	Slightly better	13	
	About the same	3	
16(a)	YES	12	-
	NO	34	46
(b)	Excellent	1	-
	Very good	3	-
	Quite good	2	-
	Adequate	6	-
(c)	YES	7	
	NO	5	
(d)	Normal	8	-
	Upset/shocked/worried	2	-
(e)	YES	5	10
	NO	29	36
(f)	Normal	1	1
	Upset/shaken	2	6
	Other	1	2
(g)	All respondents stated that there was nothing they could have done		
17	Everybody	40	27
	Respondents who did not say everybody	6	19

Question Number	Responses	Volunteers	Non-Volunteers
18(a)	YES	4	9
	NO	42	37
(b)	Serious	1	1
	Minor	3	8
(c)	Work	3	4
	Home	1	3
	Road	-	1
	Street	-	1
(d)	Too few for meaningful analysis		
(e)	YES	3	4
	NO	1	5
(f)	YES	2	3
	NO	2	5
	Not applicable	-	1
(g)	There were no other injuries		
19	The pain	5	8
	Being in hospital	5	8
	Physical damage	33	31
	Being off work	11	14
	Effect on family	30	23
	Loss of activity	29	24
20	Blindness	39	39
	Fractures	-	-
	Burns	3	2
	Paralysis	25	27
	Amputation	18	13
	Internal injuries	3	3
	Brain damage	38	36
21	Head	37	32
	Arms	7	1
	Hands	10	12
	Legs	7	5
	Back	13	6
	Eyes	32	38
	Internal organs	17	19
	Face	6	7

Question Number	Responses	Volunteers	Non-Volunteers
22	Very safe	-	2
	Quite safe	17	13
	Not very dangerous	18	14
	Quite dangerous	3	12
	Very dangerous	3	-
23(a)	Very likely	5	2
	Quite likely	6	10
	Not very likely	24	17
	Unlikely	5	11
	Very unlikely	2	2
(b)	Burns/electric shock	12	18
	Cuts/trapping/catching	21	13
	Objects falling	8	9
	Falls/fractures	7	5
	Eye injuries	3	4
	Others	4	3
(c)	Serious	22	16
	Minor	20	19
24(a)	All	2	1
	Most	13	14
	Quite a few	16	15
	Some	6	10
	Very few	4	-
	None	-	-
(b)	Individual worker	35	35
	Supervision	7	11
	Management	6	5
	Unions	2	1
25	Excellently	-	1
	Very well	10	8
	Quite well	8	10
	Adequately	14	9
	Not very well	4	3
	Badly	1	2
26	YES	2	4
	NO	33	26
	Not applicable	11	16

Question Number	Responses	Volunteers	Non-Volunteers
27(a)	(i) EYE PROTECTION		
	YES	30	21
	NO	11	19
	(ii) HAND PROTECTION		
	YES	36	32
	NO	5	8
(b)	EYE PROTECTION		
	All the time necessary	10	4
	Most of the time necessary	5	10
	Sometimes when necessary	9	4
	Not very often	2	1
	Never	2	2
	HAND PROTECTION		
	All the time necessary	21	18
	Most of the time necessary	3	8
	Sometimes when necessary	7	4
	Not very often	4	2
	Never	-	1
(c)	YES	13	14
	NO	26	20
(d)	YES	32	31
	NO	5	2
28(a)	Home only	28	25
	Car only	5	1
	Both	8	5
	Neither	5	15
(b)	Bought since time of courses	12	24
	Not bought since time of courses	34	22
(c)	Number who had bought replacements	8	22
	Number who had bought new items	4	2
29(a)	YES	19	19
	NO	27	27
(b)	VOLUNTEERS ONLY		
	Still have 'Digest'	44	
	Given it away	1	
	Don't know	1	
(c)	YES	34	12
	NO	10	7

Question Number	Responses	Volunteers	Non-Volunteers
30(a)	Much better than average	6	-
	Better than average	14.5	12
	Average	18.5	19
(b)	YES	13	10
	NO	26	20
	Not applicable	7	15
	Don't know	-	1
	More attention/care/consideration/patience	6	4
	Drive slower/drink less/wear seat belt	6	4
	Better car condition	3	1
	Highway code/stiffer tests	2	1
(c)	YES	37	28
	NO	2	3
	Don't know	-	2
	More care/attention/consideration/patience	14	9
	Drive slower/drink less/drive better	27	15
	Better car condition	3	1
	Highway code/tests, better lighting/roads/ medicals	1	7
31(a)	All the time	6	12
	Most of the time	13	3
	On long journeys only	8	8
	Sometimes	5	4
	Not very often	5	2
	Never	7	7
(b)	Wear one more now	13	8
	Wear it the same amount	22	21
(c)	Because of the first aid training	6	-
	Television advertisements	3	2
	Influence of the family	3	3
	Following accidents	1	2
	Other reasons	3	2
32	Artificial respiration	34	9
	Serious bleeding	29	19
	Unconsciousness/recovery position	6	3
	Shock	9	5
	Electric shock/cardiac arrest	3	5
	Heart attacks	4	2
	Drowning	3	2
	Internal bleeding	2	1
	Head injuries/concussion	-	3
	Fractures	17	11
	Burns/scalds	13	12
	Pressure points	4	1
	When to/not to move or treat	4	7

continued...

Question Number	Responses	Volunteers	Non-Volunteers
32 (continued)	Cuts/bruises	4	10
	Dressings/slings	2	3
	Fainting	-	2
	Strains/sprains	-	2
	Anti-coagulation cards	1	-
	Epilepsy	1	1
	Diabetes	1	-
	Non-treatments	15	17
	<u>ANALYSIS BY MAJOR TREATMENTS</u>		
	Artificial respiration	44	18
	Bleeding	35	21
	Unconsciousness	6	6
	Shock	9	5
	Other answers	58	68
	Treatments covered on the course	122	70
	Treatments not covered on the course	15	28

APPENDIX 14

RESULTS FROM THE MULTI-CHOICE QUESTIONNAIRE USED AT FACTORY A

QUESTION	NUMBER	TRAINED CORRECT	TRAINED INCORRECT	UNTRAINED CORRECT	UNTRAINED INCORRECT
Questions based on the course	1	38	8	19	27
	3	21	25	18	28
	5	21	25	20	26
	7	43	3	29	17
	9	13	33	4	42
	11	22	24	14	32
	13	42	4	33	13
	15	30	16	25	21
Questions not based on the course	2	9	37	13	33
	4	10	36	4	42
	6	9	37	7	39
	8	16	30	30	16
	10	18	28	12	24
	12	28	18	27	19
	14	16	30	13	33

NUMBER OF CORRECT AND INCORRECT ANSWERS TO QUESTIONS ON THE MULTI-CHOICE QUESTIONNAIRE USED AT FACTORY A

	TRAINED		UNTRAINED	
	CORRECT	INCORRECT	CORRECT	INCORRECT
Questions based on the course	230	138	162	206
Questions not based on the course	106	216	106	216

TOTAL NUMBER OF CORRECT AND INCORRECT ANSWERS TO QUESTIONS ON THE MULTI-CHOICE QUESTIONNAIRE USED AT FACTORY A

NO. CORRECT	COURSE QUESTIONS		NO. CORRECT	NON-COURSE QUESTIONS*	
	TRAINED	UNTRAINED		TRAINED	UNTRAINED
8	1	-			
7	5	1	7	-	-
6	7	3	6	1	-
5	21	8	5	1	3
4	6	7	4	4	8
3	4	18	3	15	7
2	2	6	2	12	15
1	-	3	1	10	8
0	-	-	0	3	5

NUMBER OF CORRECT RESPONSES GIVEN BY INDIVIDUALS
ON THE MULTI-CHOICE QUESTIONNAIRE USED AT FACTORY A

	TRAINED	UNTRAINED	SIGNIFICANCE OF THE DIFFERENCE (t-test)
Question based on the course	5	3.52	$\alpha < .005$
Questions not based on the course*	2.63	2.63	not significant

SIGNIFICANCE OF THE DIFFERENCES IN THE MEAN NUMBER OF
CORRECT ANSWERS OF TRAINED AND UNTRAINED GROUPS (MAXIMUM 8)

	QUESTIONS BASED ON THE COURSE	QUESTIONS NOT* BASED ON THE COURSE	SIGNIFICANCE OF THE DIFFERENCE (t-test)
TRAINED	5	2.63	$\alpha < .005$
UNTRAINED	3.52	2.63	$\alpha < .005$

SIGNIFICANCE OF THE DIFFERENCES IN THE MEAN NUMBER OF
CORRECT ANSWERS TO QUESTIONS BASED ON AND NOT BASED ON THE
COURSE (MAXIMUM 8)

*Where analyses include the number of correct responses to the questions not based on the course these scores have been adjusted to represent scores from 0 to 8.

APPENDIX 16

NOTES SENT TO INSTRUCTORS EXPLAINING THE 'CAUSE AND EFFECT' EXAMPLES

CAUSE AND EFFECT TRAINING

The training exercise at Factory B has been designed to help the trainees relate their first aid training to their own place of work. We want them to realise how applicable the knowledge is to them throughout the day. Therefore we want you to use examples of accident situations which are familiar to them.

Every time you teach a class in first aid you will use examples of how the injuries could have been caused, perhaps relating your own experiences. This makes the lectures more interesting and relevant. However, in this exercise we want you to use only the examples which are included on the objective cards, to make the lectures as relevant and interesting as possible to the workers. Please use all of the examples.

To help you use the examples more smoothly here are some notes explaining the situations set out on the objective cards.

ASPHYXIA (Objective Card 2)

Carbon Monoxide and Hydrogen Sulphide are gases which are produced in the processes on the plant. If they escape into confined spaces, anyone working there is very likely to suffer asphyxia.

Most of the chemical plants have electrical wiring around them, and a number of people use electric power tools. Maintainance work often has to be done on electrical instruments and wiring. Therefore there is always a chance of someone being electrocuted.

Cyanide is used in the works laboratories and the plant also produces certain organic phosphates. In cases of asphyxia from these sources mouth to mouth resuscitation must not be used or else further casualties would result.

In cases of asphyxia caused by chlorine leakage, mouth to mouth resuscitation may safely be used but further complications will occur and urgent medical treatment is essential.

WOUNDS (Objective Card 3)

The examples here are similar to many industries. Phosphorus is delivered in drums to the factory and the lids of these drums are then removed so that the phosphorus can be put into large vats. There are many other situations where workers can cut themselves.

INTERNAL BLEEDING (Objective Card 3)

There are a large number of vehicles travelling through the site which is over 50 acres in size. Many of the passages are narrow and there is a danger of people being pinned or crushed by reversing lorries or stacker trucks. There is also the danger of cargo falling from lorries or fork-lift trucks.

FRACTURES (Objective Card 4)

Many jobs within the plant, especially maintenance services, require people to work at heights, perhaps on ladders or scaffolding or on rooves. Falls have occurred and there is also the danger of these people dropping objects onto people below. Workers could also fall or trip over the railway lines which go through the works - these are used to move bulk tankers to various areas on the site.

BURNS AND SCALDS (Objective Card 4)

There are many processes on the plant requiring steam, and scalds are always possible from steam drains and leaking hot water pipes. Phosphorus is commonly used on the site. It is a substance that ignites spontaneously if it dries out. Anyone with phosphorus burns must be continuously flooded with water to prevent drying and immediately removed to the surgery (please refer to your handouts).

We hope that these notes will help you to use the examples with more confidence.

APPENDIX 17

PAMPHLET SENT TO TRAINEES AT FACTORY B CONTAINING

THE 'CAUSE AND EFFECT' EXAMPLES

(The original document was prepared
for insertion in the 'Digest of First Aid')

First Aid Training

This pamphlet has been produced as an addition to the First Aid Training which you received recently. We suggest that you attach it to your 'Digest of First Aid'. The page numbers in this pamphlet refer to the Digest.

The pamphlet shows how the injuries you learned to deal with could occur in your own surroundings, at the factory. It will show how important training in first aid is in making you aware of how injuries are caused as well as how they are treated.

We can only give a few examples here. You will be able to think of many more of your own from the plants and shops you work in. Whenever you read through your 'Digest of First Aid' think about how the injuries it describes could have been caused.

BREATHING AND RESUSCITATION Pages 15-27

Gases

Many gases are produced at the factory including carbon monoxide and hydrogen sulphide. If these escape into confined spaces, anyone working there is likely to suffer asphyxia and artificial respiration may be urgently required.

Electricity

Most of the plants have electrical wiring around them and a number of people use electric power tools. Maintenance work is regularly carried out on instruments and wiring. Therefore there is always the possibility of electrocution which can cause asphyxia.

Poisons

If asphyxia is caused by a worker coming into contact with cyanide or organic phosphates which are produced here, mouth to mouth resuscitation should not be used or further casualties will result. These are cases where a mechanical method should be used. (PAGE 26).

Chlorine

In cases of asphyxia caused by chlorine escaping, mouth to mouth resuscitation may safely be used but urgent medical treatment is essential when the patient is breathing again.

Please remember that medical aid must be summoned immediately any injury occurs or is discovered.

WOUNDS AND BLEEDING Pages 28-33

There are many ways in which you could cut yourself at work and indeed everywhere else. For instance drums of chemicals have to be opened, leaving sharp edges and there is the swarf in the workshops. You will know of many other possible causes.

Internal Bleeding

As you know many vehicles pass through the site which has many narrow passages. There is always the danger of someone being pinned or crushed by reversing lorries or stacker trucks. There is also the danger of cargo falling off these vehicles onto somebody. Internal bleeding could occur from these sort of accidents.

FRACTURES Pages 40-42

Many jobs in the factory involve working at heights, perhaps on ladders, scaffolding or rooves. Falls can occur and there is also the danger of objects being dropped onto people working below. Workers could also fall or trip over railway lines or objects left on the floor. In these cases a fracture is always possible.

BURNS AND SCALDS Page 43

Steam

There are many processes on the plant requiring steam and scalds are always possible from steam drains or leaking hot water pipes.

Fire

In a chemical plant there is always the possibility of fire which could lead either to burns or asphyxia from the fumes and smoke.

Phosphorus

Special care must be taken with phosphorus burns. If you are not aware of the correct procedure contact your Medical Department.

In this pamphlet we have only looked at the major areas and suggested some possible causes. Remember that conditions of shock and unconsciousness may follow from any of the injuries mentioned.

Please treat this pamphlet as an addition to your 'Digest of First Aid' and read through them regularly.

PRE-TRAINING INTERVIEW SCHEDULE FOR FACTORIES B AND C

1. (a) Have you ever had any first aid training? No to (e)

If yes (b) Did you find it interesting?

(c) Do you think it was worthwhile?

(d) Why did you first decide to take that course?

If no to (a)

(e) Had you ever thought about learning first aid before this opportunity?

No to Q 2

If yes (f) Why did you want to take a course?

(g) Why didn't you take a course?

VOLUNTEERS ONLY

2. Why did you volunteer for this course?

NON-VOLUNTEERS ONLY

2. (a) Did you think about volunteering for this course? No to (c)

If yes (b) Why did you decide not to?

If no to (a)

(c) Why not?

VOLUNTEERS ONLY

3. (a) What do you hope to gain from this course?

(b) Do you expect the course to change any of your attitudes?

If yes (c) In what way?

4. (a) Do you think the course will affect the way you work?

If yes (b) In what way

5. I would like you to mark on this scale how well you think you could deal with a serious injury if you came across somebody who was badly hurt.

VOLUNTEERS ONLY

6. (a) Do you expect to learn about anything other than first aid treatments on this course? No to Q7

If yes (b) What else do you expect to learn?

7. (a) Have you ever treated yourself for an injury? No to (c)

If yes (b) Was that at work?

(c) What treatments have you carried out on yourself at work? None to Q8

(d) Why did you treat yourself?

8. (a) Have you ever carried out first aid on anybody else? No to Q9.

If yes (b) What sort of injuries have you dealt with?

(c) How did you feel when you saw the injury?

(d) What was it about the injury that made you feel like that?

(e) How good do you think your treatment was?

9. Who do you think should know first aid?

10. (a) Have you ever been present at or seen the result of an accident leading to serious injury? Yes to (c). No to (b).

(b) What is the worst injury you have seen? If seen to (c) None to Q11

(c) Please describe the injury.

(d) How did you feel when you saw it? If all right to (f)

(e) What was it about the injury that made you feel like that?

(f) What did you do?

11. (a) Have you ever had a serious injury yourself? Yes to (c) No to (b)

(b) What is the worst injury you have had? If minor to Q12.

(c) Please describe it (type and area)

(d) Where did it happen?

(e) How could it have been prevented?

(f) Did you know before it happened that there was a possibility of an accident like that happening?

(g) Apart from the physical damage it caused what effect did the injury have on you?

12. People don't go to the surgery for the treatment of every minor injury and illness they have at work. <u>Please read through this list and mark the ones which you would NOT bother to go for treatment with.</u>

13. If you were seriously injured there would be several unpleasant outcomes.

(a) What would worry you most if you were seriously injured?

IF ONLY MENTION PHYSICAL DAMAGE

(b) Apart from the physical damage is there anything else that would worry you?

14. (a) Please look at this list of types of injury and mark the three you would least like to have happen to you. THEN RANK THOSE THREE.

(b) Why did you put .... first?

15. (a) Please look at this list of parts of the body and mark the three you would least like to injure. Then RANK THOSE THREE.

(b) Why did you put .... first?

16. Please mark on this scale how dangerous you think you job is for you.

17. (a) What is there about your job that is dangerous? Nothing to Q18.

(b) Does that danger worry you?

(c) What do you need to do to avoid the danger?

(d) Do you always do it? Yes to (f)

If no (e) Why not?

(f) Would you prefer to do a safer job than the one you do now?

(g) Why not? /Why don't you?

18. (a) What job outside this industry do you consider dangerous?

(b) Why do you think that job is dangerous?

(c) Would you consider doing that job?

(d) Why?/Why not?

19. (a) Do you ever do anything outside work that you think is dangerous? No to Q20.

If yes (b) How do you feel when you do it?

(c) If it is dangerous why do you go on doing it?

20. Thinking of your own job again:

(a) Please mark on this scale how likely you think you are to have a serious injury doing it.

(b) What kind of serious injuries are you thinking of?

(c) Why does this type of injury happen?

(d) What could be done to stop you being injured in that way?

21. (a) Please mark on this scale how likely you think you are to have a minor injury doing your job.

(b) Please indicate on the next scale how often (on average) you have a minor injury.

(c) What kind of minor injuries are you thinking of?

(d) Why does this type of injury happen?

(e) What could be done to stop you being injured in that way?

22. (a) Please mark on this scale how many of the accidents in this factory (on this site) you think could reasonably

be prevented.

(b) What could be done to reduce the number of accidents?

23. (a) Please look at this list and rank in order who could do most to reduce the chance of YOU having an accident at work.

(b) Why do you think .... could do most?

24. Most people doing a job take risks at one time or another.

(a) Do you ever see the people around you taking risks?

No to (e)

If yes (b) What do they do?

(c) Do you ever do that? No to (e)

If yes (d) Why do you do it? To Q25.

(e) Do you ever take risks at work? No to Q25.

If yes (f) What do you do?

(g) Why do you do it?

25. Please look at this list and mark which of these you consider to be the most important causes of accidents.

26. (a) When did you last hurt yourself at work enough to go to the surgery?

(b) What was the injury? (type and area)

(c) How serious an injury was it?

(d) Why do you think it happened?

(e) Could you have prevented it?

(f) How?/Why not?

(g) Looking back on it could you have predicted that that accident would happen?

If yes (h) Why do you think at the time you didn't forsee it?

27. (a) In general can you tell when an accident is likely to happen to you? No to (c).

If yes (b) How can you tell?

(c) Can you tell when an accident is likely to happen to someone else? No to Q28.

If yes (d) How?

28. (a) Do you think it is important to report your minor injuries to the surgery?

(b) Why?/Why not?

29. (a) In general do you think that protective clothing and equipment is useful?

(b) Do you find it comfortable?

(c) Does it interfere with your work?

30. <u>GOING BACK TO FIRST AID</u>

What do you think are the most important first aid treatments that everybody should know?

31. <u>ONE FINAL QUESTION</u>

(a) How did you find out that these courses were being run?

(b) Did you see the posters round the works?

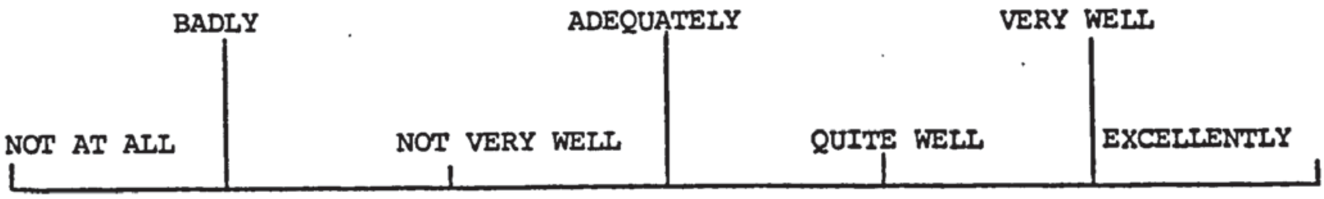
If yes (c) Did they influence you in any way?

(d) Could you tell me what they were like and what they said?

The following scales were given to the interviewees on separate sheets combined into a booklet on both the pre- and post-training interviews. Each scale was on a separate sheet.

PRE Q5

POST Q14



Page 1

PRE Q12

POST Q20

(1) GRAZED KNEE

(2) BRUISED INSTEP

(3) PAIN IN ARM

(4) SMALL BURN ON WRIST

(5) SMALL CUT ON CHEEK

(6) BANG ON HEAD

(7) PAIN IN CHEST

(8) SMALL BURN ON FOREHEAD

(9) TWISTED ANKLE

(10) DUST IN EYE

(11) SMALL CUT ON BACK OF HAND

(12) PAIN IN BACK AFTER LIFTING

(13) HEADACHE

(14) SPLINTER OF WOOD IN FINGER

Page 2

PRE Q14

POST Q22

(a) AMPUTATION

(b) INTERNAL INJURY

(c) EYE DAMAGE

(d) FRACTURE

(e) HEAD INJURY

(f) EXTENSIVE BURNS

(g) PARALYSIS

PRE Q15

POST Q23

(a) HAND

(b) BACK

(c) FACE

(d) HEAD

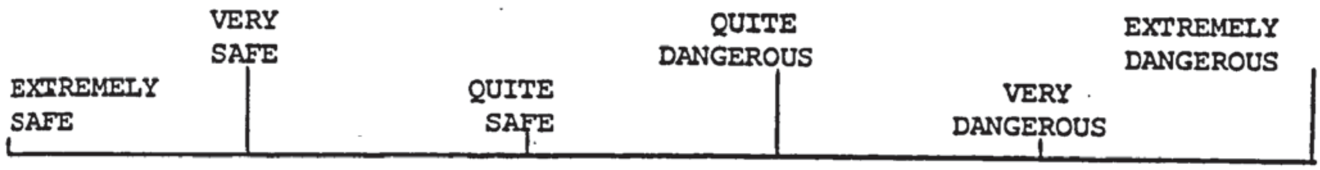
(e) LEG

(f) EYE

(g) INTERNAL ORGAN

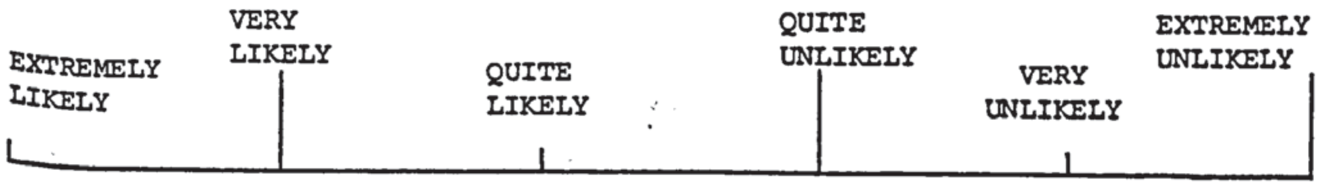
PRE Q16

POST Q24



PRE Q20(a)

POST Q27(a)



PRE Q21(a)+(b)

POST Q28(a)+(b)

EXTREMELY UNLIKELY	VERY UNLIKELY	QUITE UNLIKELY	QUITE LIKELY	VERY LIKELY	EXTREMELY LIKELY

ONE A DAY	ONE A WEEK	ONE A MONTH	ONE IN 3 MONTHS	ONE A YEAR	HARDLY EVER

PRE Q22

POST Q29

NONE	VERY FEW	SOME	QUITE A FEW	MOST	ALL

PRE Q23

POST Q30

UNIONS

YOURSELF

MANAGEMENT

OTHER WORKERS

SUPERVISION

PRE Q25

Page 9

POST Q32

(a) POOR WORKING CONDITIONS

(b) CARELESNESS

(c) LACK OF SAFETY TRAINING

(d) HASTE

(e) BAD SUPERVISION

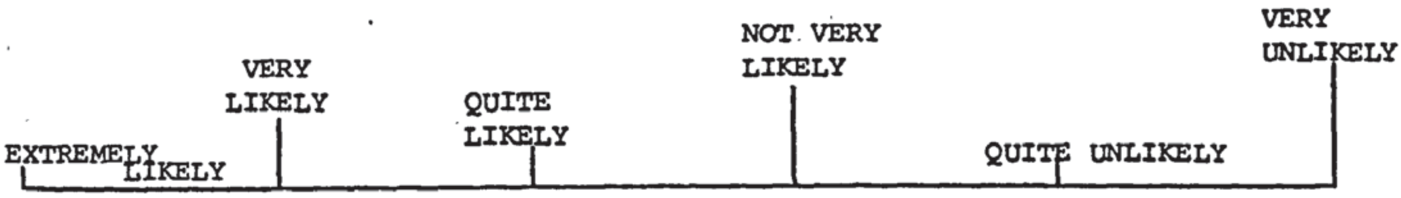
(f) THOUGHTLESSNESS

(g) UNSAFE EQUIPMENT

(h) BAD HOUSEKEEPING

Page 10

POST Q13



PAGE 1 (POST-TRAINING ONLY)

APPENDIX 19

POST-TRAINING INTERVIEW SCHEDULE FOR FACTORIES B AND C

VOLUNTEERS ONLY

1. Did you find the course -

(a) Interesting?

(b) Worthwhile?

(c) Relevant to your needs?

(d) Too easy/difficult?

(e) Had too much/little detail for the time?

VOLUNTEERS ONLY

2. (a) Did you get what you wanted from the course?

if no (b) What else did you want?

VOLUNTEERS ONLY

3. How much do you think your knowledge of first aid has increased?

INTERVIEWER RANKS

VERY MUCH

QUITE A LOT

A LITTLE

STAYED THE SAME

VOLUNTEERS ONLY

4. (a) Would you encourage other people to learn first aid?

(b) Why?/Why not?

If yes to (a)

(c) Have you encouraged anyone since you were trained?

if yes (d) Who

VOLUNTEERS ONLY

5. (a) Have you told anyone how to do any first aid since the course? No to Q6.

if yes (b) Who?

(c) What have you told them?

(d) Why did you tell them?

VOLUNTEERS ONLY

6. (a) Has the course changed any of your attitudes?

if yes (b) In what way?

VOLUNTEERS ONLY

7. Has the course affected:

(a) The way you work? No to (c)

if yes (b) In what way?

(c) Has it affected anything else you do? No to Q8.

VOLUNTEERS ONLY

8. (a) Did you learn about anything other than first aid treatments on the course? No to Q9.

if yes (b) What else did you learn?

VOLUNTEERS ONLY

9. (a) Would you like to take a refresher course in the future? No to Q10.

if yes (b) About how long after the last course would you need one?

VOLUNTEERS ONLY

10. (a) Would you like to take a full first aid course at some time?

No to (d)

if yes (b) When would you like to take one?

(c) Have you taken any steps to get on one?

If no to (a) (d) Why not?

VOLUNTEERS ONLY

11. What do you think could be done to improve the course?

VOLUNTEERS ONLY

12. (a) If you never came across a situation requiring first aid knowledge would your training still have been of use to you?

No to Q13.

if yes (b) In what way?

PROMPT-are there any other benefits?

13. Please mark on this scale <u>how likely you think you are to come across a situation needing first aid knowledge</u>.

14. Please mark on this scale <u>how well you think you could deal</u> with a serious injury if you came across somebody who was badly hurt.

15. (a) Do you feel more secure now that a lot of your work mates know first aid? No to (c).

if yes (b) In what way? To (d).

if no to (a) (c) Why not?

(d) Would you prefer more or less of them to be trained?

16. (a) Have you carried out first aid on anybody since you were last interviewed? No to Q17.

if yes (b) What have you dealt with?

(c) How did you feel when you saw the injury? If all right to (e). If not all right

(d) What made you feel like that?

(e) How good do you think your treatment was?

<u>VOLUNTEERS ONLY</u>

(f) Could you have coped as well before your treatment?

17. Who do you think should know first aid?

18. (a) Have you been present at or seen the results of an accident leading to serious injury since being interviewed? Yes to (c).

if no (b) What is the worst injury you have seen since then? None to Q19.

IF APPLICABLE

(c) Please describe it.

(d) How did you feel when you saw it?

(e) What was it about the injury that made you feel like that?

(f) What did you do?

19. (a) Have you had an injury since you were last interviewed? No to Q20.

if yes (b) How long ago?

(c) Please describe it (type and area).

(d) Where did it happen?

(e) Was it serious or minor?

(f) How could it have been prevented?

(g) Did you know before it happened that there was a possibility of an accident like that happening?

(h) Who treated the injury? If at work and self treated to (i)

(i) Why did you treat it yourself?

(j) Apart from the physical damage it caused, what effect did the injury have?

(k) What was it that upset you most about being injured?

20. People don't go to the surgery for the treatment of every minor injury and illness they have at work. Please read through this list and mark the ones you would NOT bother to go for treatment with.

21. If you were seriously injured there would be several unpleasant outcomes.

(a) What would worry you most if you were seriously injured? IF ONLY MENTION PHYSICAL DAMAGE

(b) Apart from the physical damage is there anything else that would worry you?

22. (a) Please look at this list of types of injury and mark the three you would least like to have happen to you. THEN RANK THOSE THREE.

(b) Why did you put .... first?

23. (a) Please look at this list of parts of the body and mark the three you would least like to injure. THEN RANK THOSE THREE.

(b) Why did you put .... first?

24. Please mark on this scale how dangerous you think your job is for you.

25. (a) What is there about your job that is dangerous? Nothing to Q26.

(b) Does that danger worry you?

(c) What do you need to do to avoid the danger?

(d) Do you always do it? Yes to (f)

if no (e) Why not?

(f) Would you prefer to do a safer job than the one you do now?

(g) Why not/Why don't you?

26. (a) What job outside this industry do you consider dangerous?

(b) Why do you think that job is dangerous?

FACTORY C ONLY

(c) How did you find out that it is a dangerous job?

FACTORY B (c))
) Would you consider doing that job?
FACTORY C (d))

FACTORY B (d))
) Why?/Why not?
FACTORY C (e))

27. (a) Thinking of your own job again: Please mark on this scale how likely you are to have a serious injury doing it.

28. (a) Please mark on this scale how likely you are to have a minor injury doing your job.

(b) Please indicate on the next scale how often (on average) you have a minor injury.

(c) What kind of minor injuries are you thinking of?

(d) Why does this type of injury happen?

(e) What could be done to stop you being injured in that way?

29. (a) Please mark on this scale how many of the accidents in this factory you think could reasonably be prevented.

(b) What could be done to reduce the number of accidents?

30. (a) Please look at this list and rank in order who could do most to reduce the chance of YOU having an accident at work.

(b) Why do you think .... could do most?

31. Most people doing a job take risks at one time or another.

(a) Do you ever see the people around you taking risks?
No to (e)

if yes (b) What do they do?

(c) Do you ever do that? No to (e).

if yes (d) Why? To Q32.

(e) Do you ever take risks at work? No to Q32

if yes (f) What do you do?

(g) Why do you do it?

32. Please look at this list and mark which of these you consider to be the most important causes of accidents.

33. (a) In general can you tell when an accident is likely to happen to you? No to (c).

if yes (b) How can you tell

(c) Can you tell when an accident is likely to happen to someone else? No to Q34.

if yes (d) How?

34. (a) Do you think it is important to report your minor injuries to the surgery?

(b) Why?/Why not?

35. (a) In general do you think that protective clothing and equipment is useful?

(b) Do you find it comfortable?

(c) Does it interfere with your work?

36. GOING BACK TO FIRST AID

What do you think are the most important first aid treatments that everybody should know?

37. Can you give me an example of an accident which could lead to somebody:

(a) stopping breathing?

(b) bleeding badly?

(c) being seriously burnt?

(d) having a fracture?

FACTORY B ONLY (VOLUNTEERS ONLY)

38. (a) Did you receive the leaflet about the first aid training? No to Q39.

(b) Have you read it?

(c) Have you still got it?

FACTORY C ONLY

38. (a) Have you seen the first aid posters round the works? No to Q39.

(b) How many different posters were there?

(c) What colours were they?

(d) How many had drawings on?

(e) What did the drawings show?

(f) What did the posters say?

ONE FINAL QUESTION (VOLUNTEERS ONLY)

39. (a) Do you still have your 'Digest of First Aid'? No to (d).

(b) Have you read it since your training? No to (d).

(c) Roughly how often have you read it?

(d) Have you read or heard anything else about first aid since your training?

if yes (e) What?

APPENDIX 20

RECOMMENDATIONS FOR FUTURE INTERVIEW EXERCISES

A number of useful lessons were learnt from the interview exercises at the three factories. Far more time was necessary to complete the interviews than was anticipated. Initially it was possible to conduct a full day of interviews but it soon became necessary to interview on odd days and sometimes visits had to be made to interview only one or two respondents. This problem was partly the result of complicated shift systems, particularly at Factory B where it was necessary to wait two weeks before a worker came back onto day shifts. At Factory A there was a permanent night shift and it was necessary to interview after 8,00 p.m.

The following general lessons were learned about the running of interviewing exercises of the type used in this study.

(a) The success and the length of time necessary to complete the interviews is largely dependent on the person in the factory who is responsible for arranging the interviews. This person should be enthusiastic towards the aims of the project, and both well known and liked by the interviewees.

(b) If the intervieweesare given the opportunity to refuse attendance, then they must be made aware of the nature of the interview before they make the decision. Ideally, interviewees should be introduced to the interviewer before being given the opportunity to refuse an interview, so that he can answer any queries the potential respondent may have.

(c) Interviews should be arranged at short notice to reduce the number of missed appointments.

(d) Interviewees should be allowed at least 15 minutes after a break before attending an interview, and interviews should finish well before breaks.

(e) When arranging the times of interviews allowance must be made for late arrivals, talkative interviewees, and people with particular problems, such as language or reading difficulties. However, if too much time is allowed between interviews, the interviewer's time is wasted when interviews are short or when appointments are missed. In general an interviewer should not attempt to complete more than eight or ten half-hour interviews per day. This point is particularly important towards the end of the exercise when the interviewer has completed a considerable number of interviews.

APPENDIX 21

FACTORIES B AND C - INTERVIEW RAW DATA

CATEGORIES		FACTORY B				FACTORY C			
		VOLS PRE	NON PRE	VOLS POST	NON POST	VOLS PRE	NON PRE	VOLS POST	NON POST
PRE 1									
(a)	YES	15	10			14	11		
	NO	24	29			26	29		
CERTIFICATED		5	3			6	1		
OTHER		10	5			7	10		
(b)	YES	13	9			12	9		
	NO	2	1			2	2		
(c)	YES	15	7			14	10		
	NO	-	2			-	1		
(d) VOLUNTEERED		4	-			3	1		
PART OF JOB/TRAINING		11	8			7	9		
OTHER REASONS		-	1			2	1		
(e)	YES	10	5			12	10		
	NO	13	24			14	19		
(f) USEFUL (GENERAL)		6	1			3	5		
" WORK		3	2			4	1		
" HOME		2	2			3	1		
" ROAD		-	1			1	-		
" SPORT		-	-			2	1		
INTERESTED		-	-			-	1		
(g) NO OPPORTUNITY		5	4			9	4		
DIDN'T MAKE EFFORT		3	1			-	3		
OTHER REASONS		2	-			1	4		
VOLUNTEERS ONLY									
PRE 2									
USEFUL HOME		12				9			
" WORK		10				12			
" SELF		1				-			
REFRESHER		4				2			
SAW POSTER		5				2			
USEFUL/GENERAL		-				13			
WORKS TIME		2				4			
SEEN /HAD ACCIDENT		-				3			
OTHER REASONS		6				5			

CATEGORIES		FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
NON-VOLUNTEERS ONLY									
PRE 2									
(a)	YES		13				15		
	NO		25				22		
DIDN'T KNOW ABOUT IT			-				3		
(b) FORGOT/THOUGHT TOO LATE			5				5		
NO USE/NOT INTERESTED			3				2		
LEAVING/REDUNDANT			3				-		
LOT ALREADY VOLUNTEERED			1				1		
OTHERS			-				5		
(c) NOT INTERESTED			8				4		
NO TIME			5				4		
DON'T LIKE BLOOD/ COULDN'T BE FIRST AIDER			2				4		
DIDN'T KNOW/APPLY			3				7		
TOO OLD			-				3		
OTHER REASONS			3				-		
VOLUNTEERS ONLY									
POST 1									
(a)	YES			36				37	
	NO			2				-	
(b)	YES			33				36	
	NO			5				-	
(c)	YES			35				35	
	NO			3				2	
(d) TOO EASY				2				3	
ALL RIGHT				28				31	
TOO HARD				7				3	
DON'T KNOW				1				-	
(e) TOO LITTLE				7				6	
ALL RIGHT				18				20	
TOO MUCH				12				10	
DON'T KNOW				1				-	

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
VOLUNTEERS ONLY								
POST 2								
(a) YES			29				24	
NO			9				12	
(b) MORE DETAIL			5				9	
" TIME			1				1	
" PRACTICAL			2				1	
" CONFIDENCE			2				1	
DON'T KNOW			-				1	
VOLUNTEERS ONLY								
POST 3								
VERY MUCH			3				2	
QUITE A LOT			18				15	
A LITTLE			15				19	
STAYED THE SAME			2				1	
VOLUNTEERS ONLY								
POST 4								
(a) YES			38				37	
NO			0				0	
(b) GOOD/USEFUL/IMPORTANT			16				23	
ALL SHOULD KNOW IT			8				5	
SOMEONE TO HELP ME AND OTHERS			4				5	
SAFETY/STOP ACCIDENTS			-				2	
OTHER REASONS			8				3	
(c) YES			20				20	
NO			18				16	
(d) WORKMATES			10				14	
WIFE			4				2	
CHILDREN			6				2	
OTHER RELATIONS			2				3	

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
VOLUNTEERS ONLY								
POST 5								
(a) YES			18				19	
NO			20				18	
(b) FRIENDS			8				5	
WIFE			5				8	
CHILDREN			2				5	
OTHER FAMILY			4				1	
(c) BREATHING			9				5	
BLEEDING			6				3	
HEART COMPRESSION			3				N/A	
RECOVERY POSITION/AIR PASSAGE			2				2	
BURNS			-				5	
FRACTURES			1				-	
VARIOUS FROM COURSE			2				5	
OTHER TREATMENTS			4				3	
(d) USEFUL/IN CASE NEEDED			9				15	
THEY ASKED/SHOWED INTEREST			6				3	
OTHER REASONS			2				1	
VOLUNTEERS ONLY								
PRE 3								
(a) EMERGENCY/ACCIDENT SITUATIONS	14				16			
KNOWLEDGE OF FIRST AID/TREATMENTS	17				30			
EXPERIENCE	5				3			
REFRESHER	4				3			
CONFIDENCE	-				2			

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 3(b)POST 6 (a)								
YES	11		19		12		12	
NO	22		19		23		24	
DON'T KNOW	5		-		4		1	
PRE 3(c) POST 6(b)								
MENTIONED SAFETY	3		19		3		5	
DIDN'T MENTION SAFETY	5		5		8		7	
VOLUNTEERS ONLY								
PRE 4 POST 7								
(a) YES	22		23		15		16	
NO	12		15		24		21	
DON'T KNOW	4		-		1		-	
(b) WORK/THINK SAFER	4		6		6		9	
MORE CAREFUL/CAUTIOUS/SAFETY CONSCIOUS	11		18		5		7	
TAKE PRECAUTIONS/USE PROTECTION	5		1		-		2	
MORE AWARE OF DANGER	3		6		4		1	
OTHER WAYS	2		-		1		-	

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 7								
(c) YES			9				7	
NO			29				29	
DON'T KNOW			-				-	
PRE 5 POST 14								
EXCELLENTLY	1	-	-	-	-	-	-	-
VERY WELL	-	1	1	3	2	3	-	-
QUITE WELL	3	3	8	7	6	7	18	6
ADEQUATELY	9	10	13	6	8	8	12	7
NOT VERY WELL	20	14	16	15	17	17	7	18
BADLY	4	7	-	3	2	1	-	3
NOT AT ALL	2	4	-	4	4	4	-	3
VOLUNTEERS ONLY								
PRE 6 POST 8								
(a) YES	9		14		12		10	
NO	20		24		20		26	
DON'T KNOW	10		-		8		1	
(b) TO DO WITH SAFETY	4		6		4		7	
TO DO WITH FIRST AID	3		7		4		5	
OTHER RESPONSES	3		-		2		-	

CATEGORIES	FACTORY B VOLS PRE	NON PRE	VOLS POST	NON POST	FACTORY C VOLS PRE	NON PRE	VOLS POST	NON POST
PRE 7								
(a) CARRIED OUT FIRST AID ON SELF (AT WORK)	16	15			13	12		
CARRIED OUT FIRST AID ON SELF (NOT AT WORK)	14	12			16	11		
NOT TREATED SELF	9	12			11	17		
(b) HAVE TREATED AT WORK:-								
CUTS	10	12			12	9		
EYES (FOREIGN BODIES)	2	-			-	-		
BURNS	4	1			2	-		
SPLINTERS	1	1			3	3		
BRUISES	1	3			3	-		
SPRAINS	2	1			-	-		
OTHER TREATMENTS	2	1			3	2		
(c) NOT AT WORK:-								
CUTS	10	10			13	11		
BRUISES	2	4			2	-		
SPRAINS.	3	2			3	-		
BURNS	1	1			1	1		
OTHER TREATMENTS	3	2			1	2		
(d) ONLY MINOR/COULD COPE	6	8			2	7		
BEFORE GOING TO CLINIC	4	2			-	3		
SAVE TROUBLE/TIME	3	2			4	1		
NO FIRST AIDERS THERE/ON OWN	1	-			5	-		
OTHER REASONS	1	2			2	2		
PRE 8								
(a) YES	12	7			15	10		
NO	27	32			25	30		
(b) CUTS	3	1			7	3		
FRACTURES	3	-			5	1		
BURNS	2	-			1	2		
BRUISING	-	1			2	-		
OTHERS (SERIOUS)	4	4			3	3		
OTHERS (MINOR)	3	1			-	2		

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 8								
(c) ALL RIGHT	9	4			10	7		
SICK/NERVOUS/AFRAID	1	3			2	3		
(d) TOO FEW RESPONSES								
(e) VERY GOOD	6	2			4	-		
QUITE GOOD	4	2			3	5		
ADEQUATE	1	1			4	3		
VERY BAD	-	-			1	-		
VOLUNTEERS ONLY								
POST 9								
(a) YES			37				31	
NO			1				6	
(b) AS SOON AS POSSIBLE			10				1	
1 WEEK			-				1	
2 WEEKS			1				-	
1 MONTH			-				2	
2 MONTHS			1				1	
3 MONTHS			2				-	
4 MONTHS			2				1	
6 MONTHS			8				7	
8 MONTHS			-				2	
9 MONTHS			1				2	
12 MONTHS			10				9	
15 MONTHS			-				1	
21 MONTHS			-				2	
24 MONTHS			-				1	
DON'T KNOW			-				2	
(ASSUME - AS SOON AS POSSIBLE = 6 MONTHS)								

CATEGORIES	FACTORY B				FACTORY C			
	VOLS PRE	NON PRE	VOLS POST	NON POST	VOLS PRE	NON PRE	VOLS POST	NON POST
VOLUNTEERS ONLY								
POST 10								
(a) YES			31				26	
NO			7				10	
(b) NOT ADEQUATELY ANSWERED								
(c) YES			7				6	
NO			24				19	
(d) TOO BUSY			2				2	
NOT INTERESTED/TICKLE STOMACHED			2				3	
OTHER REASONS			3				4	
VOLUNTEERS ONLY								
POST 11								
MORE TIME/LONGER			16				16	
MORE DETAIL/DEPTH			10				9	
MORE PRACTICAL			5				1	
BETTER INSTRUCTORS			3				-	
OTHERS			5				3	
NOTHING/ALL RIGHT/IDEAL			9				10	
DON'T KNOW			2				-	
VOLUNTEERS ONLY								
POST 12								
(a) YES			29				32	
NO			9				3	
DON'T KNOW			-				2	

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 12								
(b) REFERENCES TO SAFETY			3				6	
" TO FIRST AID TREATMENTS			21				20	
INCREASED KNOWLEDGE			4				3	
LEARNT ANATOMY			2				1	
OTHER RESPONSES			-				3	
POST 13								
EXTREMELY LIKELY			3	3			5	4
VERY LIKELY			4	8			9	6
QUITE LIKELY			24	14			20	15
NOT VERY LIKELY			4	7			1	9
QUITE UNLIKELY			2	1			1	3
VERY UNLIKELY			1	5			-	-
POST 15								
(a) YES			29	20			29	22
NO			8	18			8	14
NOT APPLICABLE			1	-			-	1
(b) SOMEONE TO HELP YOU/ KNOWS WHAT TO DO			21	11			17	14
SOMEONE CLOSE/ON SPOT/FAST			5	4			4	3
MORE EXPERIENCED/CONFIDENT			-	3			1	1
RESPONSES INVOLVING SAFETY			-	-			2	1
OTHER RESPONSES			2	-			4	1
(c) THEY DON'T KNOW IT			5	7			3	3
NOT THOUGHT			3	2			2	2
DON'T KNOW WHO'S TRAINED			-	3			-	8
NONE NEAR ME			-	3			1	-
OTHER REASONS			-	2			1	1
(d) ALL/MORE			37	28			32	24
SAME/LESS/OTHER			-	10			3	9

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 16								
(a) YES			4	-			7	2
NO			34	38			30	35
(b) CUTS			1	-			4	2
BURNS			1	-			2	-
UNCONSCIOUSNESS			1	-			-	-
DRUNK AND SICK			1	-			-	-
FRACTURES			-	-			2	1
CHOKING			-	-			1	-
(c) ALL RIGHT			4	-			6	2
NOT ALL RIGHT			-	-			-	-
(d) NOT APPLICABLE								
(e) EXCELLENT			-	-			1	-
VERY GOOD			1	-			1	1
QUITE GOOD			2	-			4	1
FAIR			1	-			1	-
VOLUNTEERS ONLY								
(f) YES			-				-	
NO			4				7	
PRE 9 POST 17								
ALL	25	27	30	22	21	23	26	10
SUPERVISION/MANAGEMENT	3	5	6	10	8	10	7	15
OTHER GROUPS	10	6	2	8	10	7	6	15

CATEGORIES		FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 10 POST 18									
(a)	YES	24	18	-	1	22	20	4	2
	NO	15	21	38	37	18	20	33	35
SEEN SERIOUS		24	18			22	20		
SEEN WORST		7	13			8	8		
SEEN NONE		8	8			10	12		
(b) SERIOUS SEEN									
FRACTURES		11	5			7	4		
BURNS		5	3			-	-		
DEATHS		5	4			-	1		
CUTS		3	1			6	6		
CRUSHING		3	1			1	-		
CHOKING		-	3			-	-		
AMPUTATIONS		1	2			3	6		
HEAD INJURIES		-	-			3	2		
FACIAL		-	-			3	-		
INTERNAL		2	-			-	2		
OTHER INJURIES		1	2			1	1		
(c) WORST TYPES									
FRACTURES		2	2			2	3		
CUTS		3	2			1	3		
AMPUTATIONS		-	3			2	1		
BURNS		2	2			-	-		
OTHER INJURIES		2	4			4	-		
(d) ALL RIGHT		14	10			16	11		
SICK		11	15			9	12		
OTHER RESPONSES		7	6			6	4		
(e) BLOOD		5	6			1	2		
INJURY		4	4			-	5		
OTHER RESPONSES		4	9			8	7		
(f) FIRST AID OR ASSISTED		5	6			4	-		
HELPED (NOT FIRST AID)		6	1			6	5		
CALLED HELP		5	4			4	5		
HELP ALREADY THERE		5	6			3	11		
NOTHING		3	3			9	2		
NOT APPLICABLE		5	10			-	-		

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 8(c) AND 10(d) (COMBINING FACTORIES)							VOLS	NON
	FEEL ALL RIGHT AT SIGHT OF INJURY						49	32
	FEEL UPSET, SICK ETC.						23	33
<u>PRE 11 POST 19</u>								
(a) SERIOUS	15	10	2	-	10	6	-	-
WORST (QUITE SERIOUS (POST))	18	21	1	-	25	29	1	1
NONE	6	8	34	33	5	5	33	34
(POST ONLY) MINOR			1	5			3	2
<u>POST 19</u>								
(b) 0 WEEKS			-	1			-	-
2 WEEKS			-	1			2	-
4 WEEKS			2	1			-	-
6 WEEKS			-	-			1	1
8 WEEKS			-	-			1	-
9 WEEKS			-	-			-	1
12 WEEKS			1	1			-	-
13 WEEKS			-	-			-	1
16 WEEKS			-	1			-	-
20 WEEKS			1	-			-	-
<u>PRE 11</u>								
(c) <u>SERIOUS TYPE</u>								
FRACTURES	3	3			4	1		
CUTS	4	2			4	3		
BURNS	4	-			-	-		
AMPUTATIONS	-	-			4	2		
CRUSHING	-	-			-	2		
OTHER TYPES OF INJURY	5	3			-	-		
<u>SERIOUS AREA</u>								
LEG/FOOT	4	3			5	4		
HAND/ARM	2	3			5	2		
EYES	2	-						
SHOULDER/COLLAR	2	-			1	-		
HEAD	1	1			1	1		
OTHER AREAS OF INJURY	2	4			-	1		
(b) <u>WORST TYPE</u>								
CUTS	7	5			11	14		
FRACTURES	4	7			10	8		
HEAD	-	-			3	4		
END OF FINGER AMPUTATED	1	2			1	-		
SPRAINS	1	3			-	1		
BURNS	1	1			-	-		
OTHER INJURIES	5	4			5	4		

CATEGORIES		FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
	WORST AREA								
	LEG/FOOT	8	8			8	9		
	HAND/ARM	8	6			14	13		
	HEAD	-	1			5	6		
	FACE	2	1			1	1		
	SHOULDER/COLLAR	-	4			-	-		
	OTHER AREAS	1	1			2	-		
(d)	WORK	12	12			15	22		
	HOME	4	5			8	1		
	ROAD	2	4			6	3		
	PLAY/LEISURE/SPORT	7	6			4	7		
	SCHOOL/COLLEGE	5	2			1	-		
	OTHER LOCATIONS	-	1			1	2		
(e)	YES	16	17			16	22		
	NO	16	13			17	13		
	YES BY OTHERS	2	2			4	2		
	" BY SELF	10	15			7	10		
	WITH CARE	1	-			-	-		
	WITH PROTECTION	3	-			-	-		
	WITH TRAINING/BETTER CONDITIONS	-	-			5	2		
	COULDN'T PREVENT	11	6			12	7		
	DELIBERATE/NOT APPLICABLE	5	7			5	6		
(f)	YES	6	9			8	10		
	NO	15	13			21	20		
	NOT APPLICABLE	5	8			6	5		
(g)	NON-PHYSICAL EFFECTS								
	MORE CAREFUL	7	4			6	3		
	DISABLE/DISCOMFORT	6	8			3	3		
	SHOCK/UPSET	-	-			1	4		
	OTHER EFFECTS	4	1			4	1		
	NO EFFECTS	12	17			19	24		

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 12 POST 20								
GRAZED KNEE	12	16	11	13	16	17	14	19
BRUISED INSTEP	10	10	3	11	16	14	7	7
PAIN IN ARM	13	13	10	14	22	19	9	19
SMALL BURN ON WRIST	7	10	1	11	12	17	8	11
SMALL CUT ON CHEEK	13	11	6	9	14	20	13	15
BANG ON HEAD	6	12	3	7	4	6	3	8
PAIN IN CHEST	7	8	3	2	5	6	2	6
SMALL BURN ON FOREHEAD	2	6	2	6	9	13	7	10
TWISTED ANKLE	2	3	1	3	4	4	4	3
DUST IN EYE	6	3	5	5	6	2	3	5
SMALL CUT ON BACK OF HAND	15	17	11	17	16	21	15	21
PAIN IN BACK AFTER LIFTING	6	4	4	3	4	4	2	5
HEADACHE	18	15	17	22	18	18	13	20
SPLINTER OF WOOD IN FINGER	12	12	8	13	13	10	13	14
GO WITH ALL OF THEM	6	7	10	6	7	8	12	5
NUMBER MARKED								
MORE THAN 8	-	4	-	3	1	4	2	5
8	2	-	-	1	3	3	-	2
7	2	4	2	1	6	3	2	3
6	5	1	2	4	1	6	3	3
5	3	5	1	2	6	2	6	2
4	6	2	5	8	6	4	4	6
3	4	4	5	5	3	5	2	3
2	7	4	6	1	5	2	2	6
1	4	8	7	7	2	3	4	2
0	6	7	10	6	7	8	12	5
TOTAL NUMBER MARKED	129	140	85	136	159	171	113	163

CATEGORIES		FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 13 POST 21									
PHYSICAL DAMAGE ONLY		13	8	7	16	8	11	11	8
BOTH		14	7	16	8	8	11	5	6
NON PHYSICAL DAMAGE RESPONSES		12	23	11	14	20	18	20	20
PRE 14 POST 22									
(a) 1ST CHOICE									
AMPUTATION	A	10	7	6	4	10	8	5	6
INTERNAL INJURY	B	1	3	3	4	1	3	2	2
EYE INJURY	C	8	9	4	13	7	11	10	8
FRACTURE	D	-	-	-	-	-	-	-	1
HEAD INJURY	E	3	5	7	4	6	2	6	3
BURNS	F	3	2	2	1	-	1	3	6
PARALYSIS	G	14	13	16	12	16	15	11	11
2ND CHOICE									
	A	9	12	13	9	10	10	7	9
	B	7	5	4	1	3	3	2	3
	C	6	7	5	4	7	7	5	8
	D	1	1	1	-	-	1	-	-
	E	5	2	2	7	5	8	9	7
	F	4	2	5	9	6	3	7	2
	G	7	10	8	8	9	9	7	8
3RD CHOICE									
	A	3	4	5	8	7	7	5	5
	B	6	5	3	4	5	3	4	6
	C	5	8	11	10	7	9	7	8
	D	2	2	-	1	1	-	-	-
	E	4	2	5	2	1	6	3	7
	F	11	12	11	7	12	7	8	4
	G	8	6	3	6	7	8	10	7

CATEGORIES		FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 14 POST 22									
(b) PHYSICAL DAMAGE CAUSED		13	14	17	19	30	31	8	10
MOST IMPORTANT/PRECIOUS/ VULNERABLE/WORST		2	6	4	6	-	-	10	9
AFFECT OTHER AREAS		1	1	2	2	-	-	3	3
MENTAL EFFECTS/FEAR		9	3	3	3	1	1	-	-
PAIN		-	-	2	-	1	-	1	2
EXPERIENCE		4	6	1	-	3	3	2	1
DEPENDENT ON OTHERS		-	3	3	2	4	4	8	4
AFFECT/LIMIT WORK		2	-	2	1	-	2	1	3
LIMIT SPORTS/ACTIVITIES/ MOBILITY		7	5	4	2	-	1	7	8
CAN'T SEE HOW BAD/UNDERSTAND		1	1	3	4	-	2	2	2
OTHER REASONS		1	1	1	1	-	-	-	-
PHYSICAL EFFECTS/LIMIT ACTIVITIES/INDEPENDENCE		25	29	34	32	35	38	38	39
OTHER REASONS		15	11	8	8	4	6	6	3
PRE 15 POST 23									
(a) 1ST CHOICE									
HAND	A	1	-	-	-	1	-	1	-
BACK	B	3	3	1	1	1	4	2	1
FACE	C	3	3	2	2	1	1	2	2
HEAD	D	9	9	14	10	13	9	16	13
LEG	E	-	-	1	-	1	-	-	-
EYE	F	17	17	13	18	16	21	11	16
INTERNAL ORGAN	G	6	7	17	7	7	5	5	5
2ND CHOICE									
	A	2	1	-	-	2	1	-	3
	B	3	8	8	4	2	6	3	4
	C	3	3	-	2	2	6	2	2
	D	11	9	7	10	7	4	6	9
	E	-	1	1	-	2	2	4	2
	F	7	13	17	10	11	8	12	9
	G	13	4	5	12	14	13	10	8

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 15 POST 23								
3RD CHOICE								
A	3	5	-	1	-	3	-	-
B	8	4	10	7	12	7	7	12
C	4	1	3	3	3	1	3	3
D	7	8	7	11	9	14	8	3
E	1	3	1	5	2	-	4	2
F	7	1	9	2	7	5	8	4
G	9	17	8	9	7	10	7	13
(b) PHYSICAL DAMAGE CAUSED	6	8	6	14	12	16	5	9
MOST IMPORTANT/PRECIOUS/ VULNERABLE/WORST	14	12	12	12	22	17	17	11
LONG RECOVERY-HARD TO TREAT/ SEE/TELL	4	4	9	5	1	3	3	7
AFFECT OTHER AREAS	5	3	6	3	2	5	3	7
EXPERIENCE	8	10	3	3	4	3	4	-
MENTAL EFFECTS	-	2	3	-	-	-	1	-
LIMIT ACTIVITY/MOBILITY/ WORK/SPORT	1	1	3	2	-	4	6	6
DEPEND ON OTHERS	-	-	-	-	-	-	4	-
OTHER REASONS	-	1	-	2	-	-	1	3
MOST IMPORTANT/SERIOUS/ PHYSICAL EFFECTS	26	24	28	31	36	42	35	33
OTHER REASONS	12	17	15	10	5	6	9	10
PRE 16 POST 24								
EXTREMELY SAFE	1	3	1	1	-	2	-	1
VERY SAFE	4	2	2	2	12	7	6	6
QUITE SAFE	15	20	17	24	19	24	25	22
QUITE DANGEROUS	13	11	13	6	7	6	6	5
VERY DANGEROUS	2	2	3	4	2	1	-	2
EXTREMELY DANGEROUS	4	1	2	1	-	-	-	1

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 17 POST 25								
(a) CHEMICALS/ACIDS	27	26	25	18	2	-	2	-
PHOSPHORUS	8	10	7	6	-	-	-	-
DUST/FUMES/GASES	7	5	5	5	1	-	-	-
TUBES/SWARF	-	-	-	-	4	8	-	3
ELECTRICITY	1	4	4	4	2	-	3	2
PRESSURE/HYDRAULICS	-	-	-	-	3	1	1	2
PRESSES/MACHINERY	-	-	-	-	5	9	10	3
CRANES	-	-	-	-	4	7	11	7
VEHICLES	-	-	-	-	-	-	-	3
TOOLS	-	-	-	-	-	-	1	-
CONDITIONS/PLANT ETC.	4	2	2	-	4	3	1	1
EXPLOSIONS	4	2	1	-	-	-	-	-
CLIMBING/HEIGHTS	-	-	-	-	3	1	3	4
LIFTING	-	-	-	-	-	3	2	1
SPECIFIC JOBS	-	-	-	-	3	3	4	3
OBJECTS FALLING	-	-	-	-	-	-	-	1
NOTHING	1	1	1	6	13	11	1	1
(b) YES	9	7	6	4	4	4	6	4
NO	29	28	30	28	23	25	24	23
(c) USE PROTECTION	14	9	10	8	4	9	3	2
TAKE PRECAUTIONS/CHECK SAFE	13	12	14	8	4	6	3	6
USE CARE/THINK/ATTENTION	10	16	14	7	10	12	14	6
TAKE STEADY/TIME/NOT RUSH	3	2	-	3	2	-	-	-
WORK PROPERLY/SENSIBLY	-	-	-	5	1	7	3	4
NEW BETTER/ALTER EQUIPMENT	-	-	-	-	3	-	3	1
OTHER ACTIONS	3	6	6	11	3	3	8	4
USE CARE/CAUTION	10	16	14	7	10	12	14	6
WORK PROPERLY/PROTECTION	30	23	25	24	11	22	9	12
MANAGEMENT/OTHER ACTIONS	3	6	6	11	6	3	11	5
(d) YES	32	28	34	25	19	21	26	20
NO	2	2	1	2	3	3	-	3
NOT APPLICABLE	-	-	-	-	2	-	4	4
(e) OMITTED AS TOO FEW RESPONSES								

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 17 POST 25								
(f) YES	15	13	9	10	5	2	5	2
NO	23	22	27	21	22	27	25	25
(g) WHY NOT PREFER A SAFER JOB?								
ENJOY/SATISFIED WITH THIS JOB	11	10	10	10	8	10	12	11
THIS JOB IS SAFE ENOUGH	8	4	13	7	13	9	9	10
OTHER REASONS	8	8	6	5	1	7	4	5
WHY DON'T YOU GET A SAFER JOB?								
WOULD DO IF COULD/IS LEAVING	12	7	10	4	TOO FEW RESPONSES			
LIKE THIS/USED TO IT	6	8	1	7				
PRE 18 POST 26								
(a) MINING	15	15	16	16	13	9	6	11
FOUNDRY/STEEL	8	8	9	7	8	11	8	4
BUILDING	5	5	6	4	10	3	6	4
HEIGHTS/STEEPLEJACK/SCAFFOLDING/STEEL ERECTION	5	4	3	3	8	7	11	7
FIREMAN	3	2	5	3	2	-	1	-
OIL RIGS	2	1	2	1	3	-	2	1
DRIVING	2	1	1	1	6	4	5	4
DIVING	-	-	-	-	2	2	1	1
CHEMICALS/ASBESTOS	-	-	-	-	1	3	1	4
OTHER INDUSTRIES	7	5	2	9	9	8	1	1
ANY/ALL	1	3	-	2	1	2	-	-
DON'T KNOW	-	-	-	-	1	2	3	2

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 18 POST 26								
(b) HEAT/FIRE/HOT/METAL	9	6	11	8	4	5	4	5
UNDERGROUND/CLOSED IN/CAN'T GET OUT	7	9	6	7	2	8	1	7
HEARD/EXPERIENCE	4	8	6	9	2	2	3	2
CAVE-INS	2	1	5	1	-	-	1	1
ATMOSPHERE/DUST/GAS/HEALTH HAZARDS	10	5	5	3	7	8	4	6
HEIGHTS/FALLS	4	5	3	5	6	12	9	9
EXPLOSIONS	3	1	1	1	4	3	2	1
DANGER/RISKS	5	4	4	-	7	3	6	3
HIDDEN HAZARDS/CAN'T FORSEE/ UNEXPECTED	5	5	1	3	-	-	-	-
OBJECTS FALLING	3	3	-	1	-	-	4	1
BAD CONDITIONS/WEATHER/WORK HARD	2	3	-	1	-	-	3	1
RELY ON OTHERS/OTHERS TAKE NO PRECAUTIONS/BAD SAFETY/ NEGLIGENT	1	1	4	2	5	3	6	3
OTHER FACTORS	-	3	-	2	9	5	1	2
DANGER	49	40	40	31	35	42	37	36
OTHER FACTORS	6	14	6	12	11	7	7	5
(c) YES	5	8	10	5	16	6	7	3
NO	29	27	26	28	22	29	26	32
(d) WHY NOT CONSIDER THAT JOB								
DANGERS	9	10	5	13	8	14	11	12
PHOBIAS	15	8	9	11	4	5	4	8
DOESN'T APPEAL	10	8	6	4	9	10	9	8
OTHER REASONS	4	6	7	4	4	1	5	6
DANGERS	9	10	5	13	8	14	11	12
OTHER REASONS	29	22	22	19	17	16	18	22
FACTORY C ONLY - HOW FIND OUT DANGEROUS?								
PERSONAL EXPERIENCE							21	16
EXPERIENCE OF OTHERS							9	5
NEWS MEDIA/TRAINING							11	20

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 19								
(a) YES	18	18			20	12		
NO	21	20			20	28		
(b) ALL RIGHT	17	11			16	7		
WORRIED, UNSAFE, ANXIOUS	1	7			-	1		
(c) NECESSARY	7	4			11	2		
ENJOY IT	5	3			4	-		
NOT DANGEROUS (FOR ME)	3	1						
CONVENIENCE	1	3			2	2		
ALWAYS DONE IT	1	2			1	1		
CHALLENGE	-	-			2	-		
PART OF LIFE	-	-			-	2		
LEAVE IF DANGEROUS	-	-			-	2		
ACCEPT THE RISK	-	-			-	2		
OTHER REASONS	1	1			-	1		
WHAT THEY DO								
DRIVING	7	9			9	6		
WORK ON HOUSE/D.I.Y.	6	3			5	5		
SPORTS/ACTIVITIES	2	4			5	1		
CAR MAINTENANCE	1	2			-	1		
OTHER ACTIVITIES	2	1			2	-		
PRE 20 POST 27								
(a) EXTREMELY LIKELY	-	1	-	-	2	-	-	-
VERY LIKELY	6	5	2	2	4	3	3	5
QUITE LIKELY	12	13	13	9	3	6	8	4
QUITE UNLIKELY	10	10	10	10	15	9	9	12
VERY UNLIKELY	6	8	13	11	9	18	10	13
EXTREMELY UNLIKELY	5	2	-	6	5	4	7	3

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 20 POST 27								
(b) SERIOUS INJURIES								
BURNS	21	25	24	21	3	2	1	1
FALLS	8	4	6	4	3	3	2	4
GAS/FUMES/CHEST INJURIES	5	5	5	3	-	-	-	-
EYE INJURIES	6	5	5	2	3	3	4	2
ELECTROCUTION/BURNS	1	3	5	3	1	-	1	1
OBJECTS FALLING/CRUSHING	1	1	-	5	8	9	7	10
CUTS	1	1	-	1	5	6	1	9
AMPUTATIONS	-	1	-	1	3	7	5	4
FRACTURES	1	1	-	1	2	2	3	2
HEAD INJURIES	1	-	2	-	1	3	3	1
EXPLOSIONS	2	1	-	1	-	-	-	-
LEG/FOOT INJURIES	-	-	-	-	2	-	3	-
OTHER INJURIES	-	3	2	-	7	4	2	2
ANY	-	-	1	1	-	-	-	-
NONE	-	-	2	3	1	5	4	3
EXTREMELY UNLIKELY TO BE INJURED	-	-	-	-	9	5	6	3
(c) CARELESS	9	7	8	5	6	2	4	4
NEGLIGENT/STUPID/NOT THINKING	6	7	5	3	-	2	4	6
SPILLED CHEMICALS	3	1	3	7	-	-	-	-
FAMILIARITY	-	2	3	-	-	-	-	-
POOR HOUSEKEEPING	2	-	2	-	1	-	-	1
RUSHING/CUTTING CORNERS	1	-	2	-	-	-	-	-
NO PROTECTION	1	-	1	2	1	3	1	2
MISTAKES	1	3	1	3	-	-	-	-
WORKING WRONGLY	2	1	-	4	5	5	3	4
OTHERS (INDIVIDUAL)	1	1	-	-	2	1	1	-
EQUIPMENT/PLANT/LAYOUT/FLOORS	8	11	6	5	5	10	9	5
INADEQUATE PROTECTION	2	-	2	1	-	-	-	-
OTHERS (MANAGEMENT)	1	-	-	2	1	2	1	1
ACCIDENT/CHANCE	3	2	3	5	-	1	7	7
TUBES/METAL FLYING	-	-	-	-	6	6	-	-
OTHERS (UNAVOIDABLE)	3	4	-	-	-	1	-	3
SUMMARY								
CAUSED BY INDIVIDUAL	26	22	25	24	15	13	13	17
CAUSED BY MANAGEMENT	11	11	8	9	6	12	10	6
UNAVOIDABLE	6	6	3	5	6	8	7	10

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 20 POST 27								
(d) PREVENT BY INDIVIDUAL	13	18	31	16	15	21	14	22
PREVENT BY MANAGEMENT	12	11	9	8	11	3	5	5
CAN'T PREVENT	14	9	5	11	2	6	6	6
PRE 21 POST 28								
(a) EXTREMELY UNLIKELY	4	1	1	3	1	2	2	3
VERY UNLIKELY	2	5	3	6	6	5	4	2
QUITE UNLIKELY	4	5	7	6	4	3	6	4
QUITE LIKELY	17	14	19	16	20	20	12	18
VERY LIKELY	10	11	4	4	7	6	10	7
EXTREMELY LIKELY	2	3	4	3	2	4	3	3
(b) 1/DAY	2	-	-	-	2	-	-	1
1/WEEK	6	3	4	6	4	5	4	1
1/MONTH	5	6	8	10	11	5	10	10
1 IN 3 MONTHS	6	16	9	8	11	13	12	9
1/YEAR	13	7	12	4	3	5	7	3
HARDLY EVER	7	7	5	10	9	12	4	13
(c) MINOR INJURIES								
CUTS	16	18	19	23	29	20	25	20
BURNS	12	11	10	9	1	5	1	5
BRUISES	2	6	5	6	10	10	9	8
KNOCKS/SCRATCHES/GRAZES	9	7	6	3	10	10	9	8
EYE INJURIES	7	7	6	3	2	1	-	2
SPLINTERS	3	1	2	-	2	6	4	6
OTHER INJURIES	2	4	4	4	-	2	-	-
NONE/HARDLY EVER INJURED	-	1	2	4	3	4	3	9

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 21 POST 28								
(d) CARELESS	5	3	6	4	2	3	3	4
NEGLIGENT/STUPID	3	-	4	4	-	1	-	-
POOR HOUSEKEEPING	-	4	1	4	1	-	-	-
RUSHING	3	-	2	3	2	-	1	1
HANDLING/WRONG TOOLS	-	3	2	3	2	-	-	-
NO PROTECTION	2	4	2	2	2	1	3	3
WORKING WRONGLY	4	-	3	2	2	-	-	-
FAULTY PLANT/EQUIPMENT	10	10	8	7	4	5	6	6
PROTECTION: CAN'T USE/ INADEQUATE/NOT GIVEN	-	-	2	1	5	3	9	4
ACCIDENT/CHANCE	8	5	6	6	5	3	2	2
ROUGH/SHARP METAL ENDS	2	3	2	3	9	13	11	6
SPILLED CHEMICALS	6	2	-	-	-	-	-	-
OTHER UNAVOIDABLE CAUSES	1	-	3	-	2	-	2	-
CAUSED BY								
INDIVIDUAL	17	14	20	22	11	5	7	8
MANAGEMENT	10	10	10	8	9	8	15	10
UNAVOIDABLE	17	10	11	9	16	16	15	8
(e) PREVENT BY								
INDIVIDUAL	17	17	16	15	18	16	15	15
MANAGEMENT	8	4	7	5	6	8	8	8
CAN'T PREVENT	17	16	15	15	17	12	12	7
PRE 22 POST 29								
(a) NONE	1	-	-	-	1	-	-	-
FEW	4	3	1	5	6	9	5	6
SOME	11	8	8	11	8	4	8	7
QUITE A FEW	11	12	13	8	12	11	10	15
MOST	11	11	15	12	5	3	3	1
ALL	-	2	1	-	5	3	3	7

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 22 POST 29								
(b) MORE CARE	2	7	9	6	9	5	5	7
SAFETY CONSCIOUS/THINK/AWARE	7	1	6	4	10	7	7	7
WORK SAFELY/CORRECTLY	5	3	3	10	10	13	7	10
NOT RUSHING	2	4	2	2	3	1	1	3
WEAR PROTECTION	4	2	3	3	4	2	4	2
OTHER INDIVIDUAL ACTIONS	3	2	4	7	-	-	2	-
JOB AND/OR SAFETY TRAINING	11	5	15	2	4	3	6	6
PLANT/EQUIPMENT/CONDITIONS	4	8	6	3	1	2	5	5
BETTER SUPERVISION	2	2	-	3	-	1	2	4
OTHER MANAGEMENT ACTIONS	5	5	3	7	6	4	7	3
NO MORE/DIFFICULT TO PREVENT	3	4	1	3	4	5	2	3
DON'T KNOW	5	7	1	2	1	7	-	2
INDIVIDUAL ACTIONS	23	19	27	32	36	28	26	29
MANAGEMENT ACTIONS	22	20	24	15	11	10	20	18
PRE 23 POST 30								
(a) 1ST CHOICE								
UNIONS	-	-	-	-	3	1	1	-
YOURSELF	32	27	29	31	27	23	25	24
MANAGEMENT	2	7	2	4	4	5	2	4
OTHER WORKERS	2	3	5	1	3	10	2	3
SUPERVISION	3	2	2	2	3	1	7	6
2ND CHOICE								
UNIONS	-	-	-	1	2	-	1	3
YOURSELF	4	6	6	2	8	11	6	7
MANAGEMENT	6	5	2	4	6	3	6	1
OTHER WORKERS	18	23	16	23	18	15	21	18
SUPERVISION	11	5	14	8	7	11	3	8
3RD CHOICE								
UNIONS	1	1	2	5	2	-	2	4
YOURSELF	2	4	3	2	3	6	5	4
MANAGEMENT	8	5	9	6	5	8	4	9
OTHER WORKERS	9	7	6	8	12	7	6	7
SUPERVISION	19	21	18	17	17	21	20	13
4TH CHOICE								
UNIONS	8	14	14	9	9	6	8	7
YOURSELF	1	1	-	3	1	-	1	2
MANAGEMENT	20	14	18	19	19	22	17	17
OTHER WORKERS	5	2	3	3	3	5	4	4
SUPERVISION	5	7	3	5	11	6	7	7

CATEGORIES	FACTORY B VOLS PRE	NON PRE	VOLS POST	NON POST	FACTORY C VOLS PRE	NON PRE	VOLS POST	NON POST
PRE 23 POST 30								
(a) 5TH CHOICE								
UNIONS	30	23	22	23	24	33	25	23
YOURSELF	-	1	-	-	1	-	-	-
MANAGEMENT	3	7	7	5	6	2	8	6
OTHER WORKERS	5	4	8	3	4	3	4	5
SUPERVISION	1	3	1	6	2	1	-	3
(b) MANAGEMENT								
THEIR RESPONSIBILITY	1	1	-	-	2	4	-	1
THEY HAVE POWER/MONEY	-	2	-	-	-	-	1	2
OTHER REASONS	1	4	2	4	2	1	1	1
SUPERVISION								
ON SPOT, KNOW/SEE WHAT HAPPENS	2	1	-	1	2	-	4	2
HAVE AUTHORITY	3	-	-	1	-	-	1	1
SHOULD INSIST/TAKE NOTICE	1	-	1	-	-	1	2	3
OTHER REASONS	-	1	1	-	1	-	-	-
OTHER WORKERS								
SHOULD TAKE MORE CARE	-	-	2	-	2	5	-	3
THEY CAUSE ACCIDENTS	1	2	1	-	-	3	-	-
YOU RELY ON THEM	-	1	1	-	-	-	1	-
OTHER REASONS	-	-	1	1	1	2	1	-
UNIONS								
SHOULD INVESTIGATE ACCIDENTS/ PRESSURIZE, MAKE EFFORTS	-	-	-	-	1	1	1	-
THEY ARE STRONGER THAN MANAGEMENT	-	-	-	-	1	-	-	-
THEY ARE RESPONSIBLE FOR CONDITIONS	-	-	-	-	1	-	-	-
YOURSELF								
SHOULD LOOK AFTER SELF	5	5	14	8	1	-	5	7
YOU CAUSE ACCIDENTS/GET HURT/ DO THE JOB	10	15	3	12	11	15	11	12
SHOULD TAKE CARE/THINK	6	4	3	5	6	7	7	5
SHOULD WORK SAFELY	3	7	2	8	3	4	1	1
CAN STOP/REPORT/PREVENT/KNOW WHAT DOING	10	3	11	5	-	-	-	-
SHOULD PREVENT ACCIDENTS ETC. WORK SAFELY/TAKE CARE	24	19	30	26	9	11	12	13
RESPONSIBLE/GET HURT	10	15	3	12	12	15	12	12

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 24 POST 31								
(a) YES	26	29	27	31	30	21	28	20
NO	13	10	11	7	9	19	8	16
NOT APPLICABLE	-	-	-	-	1	-	1	1
(b) NO PROTECTION	13	5	10	7	4	5	7	5
CARELESS/RUSHING	7	10	14	17	8	4	9	4
WORK WRONGLY/UNSAFELY	9	13	10	12	19	13	13	13
(c) YES	13	15	10	16	11	5	9	9
NO	13	11	16	14	13	8	15	5
NOT APPLICABLE	-	-	-	-	6	8	4	6
(d) QUICKER/EASIER	7	11	8	8	9	-	5	7
OTHER REASONS	5	4	3	9	5	5	5	3
(e) YES	8	5	8	3	11	12	6	6
NO	18	19	19	19	17	23	22	22
TOTAL-TAKE RISKS	21	20	19	19	22	17	15	15
" DON'T TAKE RISKS	18	19	19	19	17	23	22	22
(f) NO PROTECTION	2	-	3	1	-	2	1	-
RUSHING/SHORT CUTS	1	1	-	-	1	3	-	-
WORK WRONGLY/UNSAFELY	3	2	4	2	8	6	5	5
CARELESS	1	1	-	-	1	-	-	1
(g) QUICKER/EASIER	4	3	8	4	4	6	1	4
OTHER REASONS	3	2	2	1	6	4	5	2
(d+g) QUICKER/EASIER	11	14	16	12	13	6	6	11
OTHER REASONS	8	6	5	10	11	9	10	5

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 25 POST 32								
POOR WORKING CONDITIONS	16	16	17	18	18	17	14	13
CARELESSNESS	36	36	31	32	38	37	32	35
LACK OF SAFETY TRAINING	25	16	27	14	23	20	20	18
HASTE	24	29	24	28	31	31	30	28
BAD SUPERVISION	15	11	14	11	17	14	12	12
THOUGHTLESSNESS	28	23	29	24	30	30	31	30
UNSAFE EQUIPMENT	25	19	26	21	25	20	18	23
BAD HOUSEKEEPING	17	10	22	15	22	17	22	13
MANAGEMENT FACTORS (A+C+E+G)	81	62	84	64	83	71	64	66
INDIVIDUAL FACTORS (B+D+F+H)	105	98	106	99	121	115	115	106
NO MARKED								
8	6	2	6	3	10	6	4	4
7	-	3	1	-	2	1	2	1
6	5	1	4	2	4	3	4	4
5	9	3	11	9	5	7	9	8
4	9	13	9	13	6	12	11	12
3	7	16	6	9	11	7	6	7
2	3	1	1	1	2	4	1	-
1	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-
PRE 26								
(a) 0-6 WEEKS	8	8			9	5		
7 WEEKS - 4 MONTHS	10	7			8	6		
5 MONTHS - 1 YEAR	11	5			8	12		
OVER 1 YEAR AGO	4	8			10	8		
CAN'T REMEMBER/NONE	5	10			5	9		
LESS THAN 1 YEAR AGO	29	20			25	23		
NONE/MORE THAN 1 YEAR AGO	9	18			15	17		
(b) TYPE								
CUT	9	5			19	15		
BURN	8	6			-	1		
FOREIGN BODY (EYE)	6	5			2	2		
SPRAIN/STRAIN	5	1			5	3		
GASSING	1	4			-	-		
BRUISE	-	1			3	1		
SCRATCH/GRAZE	-	3			1	1		
FRACTURE	-	1			2	1		
SPLINTER	2	-			2	1		
OTHER TYPES	2	3			2	4		

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 26(b) continued/..								
AREA								
SHOULDER/ARM/HAND	16	11			24	22		
EYE	9	5			2	3		
LEG/FOOT	5	3			4	-		
FACE/NOSE/HEAD (MINOR)	3	2			2	-		
INTERNAL	1	5			1	-		
BACK	1	-			2	3		
OTHER AREAS	1	2			-	1		
(c) MINOR	28	21			25	20		
QUITE SERIOUS	3	6			9	7		
SERIOUS	-	-			2	3		
(d) CARELESS	7	7			7	9		
NO PROTECTION	2	2			2	2		
RUSHING	-	3			-	1		
WORKING WRONGLY/UNSAFELY	3	1			7	6		
PLANT/EQUIPMENT	6	11			9	6		
PURE ACCIDENT	5	3			3	2		
FAULTY CHEMICALS/BARS	5	-			4	6		
OTHER ACCIDENTAL CAUSES	-	-			4	1		
WORKERS FAULT	12	13			16	18		
MANAGEMENT FAULT	6	11			9	6		
ACCIDENTAL	10	3			11	9		
(e) YES	12	11			19	17		
NO	22	16			17	12		
(f) HOW?								
CARE	5	3			3	10		
PROTECTION	3	3			5	3		
WORK SAFER	3	1			9	5		
NOT RUSHING	-	4			-	-		
BY MANAGEMENT	-	-			2	-		
WHY NOT?								
ACCIDENT	2	2			5	6		
COULD NOT PREVENT	7	10			1	5		
OTHERS FAULT/PLANT/EQUIPMENT ETC.	4	2			5	1		

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 26								
(g) YES	6	9			8	5		
NO	26	18			24	24		
(h) OMITTED AS NOT ADEQUATELY ANSWERED								
PRE 27 POST 33								
(a) YES	14	8	12	12	16	17	16	6
NO	24	29	26	26	24	23	21	31
(b) 6TH SENSE, LAW OF AVERAGES/ FEELING/EXPERIENCE	9	5	9	8	4	1	3	-
NOTICE RISK/DANGER	6	3	2	6	6	13	10	4
TAKING RISKS/CARELESS/UNSAFE	3	2	7	2	3	5	2	2
FEELING	9	5	9	8	4	1	3	-
SEE SOMETHING	9	5	9	8	9	18	12	6
(c) YES	29	21	28	23	31	32	30	23
NO	9	16	10	15	9	8	7	14
(a+c) PREDICT TO SELF AND OTHERS	12	6	8	9	14	14	15	6
CAN'T PREDICT TO SELF OR OTHERS	7	14	6	12	7	5	6	14
(d) NO PROTECTION/TAKE RISKS/ WORK UNSAFELY/WRONGLY	20	18	26	31	18	18	25	14
SEE SOMETHING THEY CAN'T/DON'T	5	2	3	4	5	7	4	7
GOING TO HAPPEN SOMETIME/ALL HAVE ACCIDENTS	4	-	-	-	3	3	-	-
JOB/PLANT/EQUIPMENT UNSAFE ETC.	2	1	1	2	1	2	2	1
FROM MY EXPERIENCE	-	-	-	-	2	3	1	-
THEIR FAULT	20	18	26	31	18	18	25	14
NOT THEIR FAULT	11	3	4	6	11	15	7	8

CATEGORIES	FACTORY B				FACTORY C			
	VOLS PRE	NON PRE	VOLS POST	NON POST	VOLS PRE	NON PRE	VOLS POST	NON POST
PRE 28 POST 34								
(a) YES	35	29	34	30	32	33	33	28
NO	3	9	4	8	8	7	4	9
(b) WHY NOT IMPORTANT								
WASTE OF TIME	1	4	4	2	4	2	4	3
OTHER REASONS	1	4	2	6	4	5	-	7
WHY IMPORTANT								
TURN WORSE/DEVELOP/SEPSIS	28	17	13	14	15	18	14	15
IN THIS ATMOSPHERE/CONDITIONS	7	7	9	8	9	6	10	6
DON'T KNOW HOW BAD/ CONSEQUENCES	3	4	4	5	2	2	3	3
TREATMENT BETTER/QUICKER ETC.	2	1	3	2	1	3	1	1
EXPERIENCE (OWN AND OTHERS)	-	-	-	-	3	1	-	-
COULD CAUSE FURTHER ACCIDENTS SAFETY - SHOW PATTERNS	-	-	-	-	1	-	-	-
ASARESULT OF FIRST AID TRAINING	2	2	5	-	2	2	1	-
HAVE TO/TOLD TO/RULE	1	-	3	-	-	2	-	1
COMPENSATION/REPORTED	10	4	7	4	6	7	5	6
FOR TREATMENT REASONS	40	29	29	29	31	30	28	25
FOR RECORD/SAFETY REASONS	13	6	15	4	8	11	6	7
PRE 29 POST 35								
(a) YES	37	37	38	38	40	38	37	37
NO	1	1	-	-	-	2	-	-
(b) YES	18	21	23	27	21	25	25	18
NO	20	17	15	11	19	15	10	19
NOT APPLICABLE	-	-	-	-	-	-	2	-
MENTIONED								
GLASSES/GOGGLES	3	4	1	-	-	2	-	-
HELMET/HATS	1	1	2	1	1	4	1	-
GLOVES	-	-	1	1	1	2	3	1
APRONS/OVERALLS/TROUSERS	1	1	-	2	-	1	1	-
EARMUFFS	-	-	-	-	3	2	2	2
SHOES	-	-	-	-	-	4	1	5
MASKS	-	-	-	-	-	-	-	1

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 29 POST 35								
(c) YES	16	15	16	16	17	11	9	12
NO	21	23	22	22	23	29	27	25
NOT APPLICABLE	1	-	-	-	-	-	1	-
MENTIONED								
GOGGLES/GLASSES	3	3	6	4	3	-	-	-
GLOVES	3	1	2	1	3	1	1	3
HELMET	-	-	1	-	2	2	-	-
OVERALLS	-	-	1	1	-	-	-	-
EARMUFFS	-	-	-	-	2	1	2	4
SHOES	-	-	-	-	-	1	-	1
PRE 30 POST 36								
BREATHING	13	9	28	11	9	5	15	5
BLEEDING	23	14	22	17	22	20	21	18
SHOCK	3	4	4	5	2	3	2	2
UNCONSCIOUSNESS	5	-	4	1	2	1	10	1
ELECTRIC SHOCK	3	3	3	2	3	7	2	7
HEART ATTACK/CARDIAC MASSAGE	1	1	5	1	4	4	1	6
INTERNAL INJURIES	4	2	2	1	4	-	-	1
HEAD INJURIES	4	2	1	1	3	2	-	1
DROWNING	1	-	1	-	1	1	-	-
BURNS	11	5	7	9	7	6	6	2
FRACTURES	13	10	18	8	14	17	13	9
WHEN TO MOVE/DO	2	5	2	3	5	5	5	3
EYE INJURIES	5	1	-	-	4	2	-	3
BACK "	1	2	1	-	1	-	-	-
OTHER SERIOUS TREATMENTS	2	3	1	1	-	-	-	1
CUTS/BANDAGING	10	7	2	8	6	10	9	8
FAINTING	3	-	2	1	3	2	1	2
MAKE COMFORTABLE	-	1	2	3	2	5	-	2
BRUISES	2	-	-	1	1	3	-	-
TOURNIQUES	1	2	-	3	1	2	-	3
OTHER MINOR TREATMENTS	2	3	2	-	10	6	2	1
TOTAL	(109)	(74)	(107)	(76)	(104)	(101)	(87)	(75)
MOST IMPORTANT TREATMENTS	78	40	77	48	57	49	57	43
SERIOUS "	23	21	22	12	24	24	18	16
MINOR "	18	13	8	16	23	28	12	16
ON COURSE	82	51	91	62	64	61	76	46
NOT ON COURSE	27	23	16	14	40	40	11	29

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 31								
(a) POSTER	29	31			31	31		
UNION	5	-			8	-		
SUPERVISION/MANAGER	1	1			2	1		
SAFETY REP./OFFICER	2	1			-	-		
SMALL NOTICE	-	-			11	20		
OTHERS	3	2			-	1		
DIDN'T KNOW	N/A	4			N/A	5		
(b) YES	38	36			31	31		
NO	-	2			9	9		
(c) YES	28	13			26	14		
NO	3	20			4	17		
NOT APPLICABLE	5	2			-	-		
(d) COLOURS								
BLACK WITH YELLOW BACKGROUND	16	5			10	8		
ONE COLOUR CORRECT OR REVERSAL OF COLOURS	8	9			4	6		
INCORRECT/DIDN'T KNOW	14	22			17	17		
OTHER COLOURS MENTIONED								
WHITE	7	3			5	5		
RED	4	4			10	6		
GREEN	3	1			-	2		
(PALE) BLUE	1	1			1	1		
(DARK) BROWN	-	1			2	-		
PURPLE	-	-			-	1		
(e) WHAT POSTERS SAID (MAXIMUM SCORE 11)								
7	1	-			1	-		
6	-	1			-	-		
5	3	-			2	-		
4	3	2			3	2		
3	8	1			4	3		
2	9	8			9	7		
1	6	8			6	9		
0	8	16			6	10		

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
PRE 31 (e) cont.								
MARKS FOR								
LEARN FIRST AID (1)								
IN WORKS TIME (1)								
4 HOURS (1)								
4 AREAS (1)								
NAMING 1 OR 2 AREAS (1) OR								
NAMING 3 OR 4 AREAS (2)								
HELP WORK MATES (1)								
HELP FAMILY (1)								
NO COST TO YOURSELF (1)								
YOU KNOW IT MAKES SENSE (1)								
NAME TO PERSONNEL (1)								
MORE THAN 2	15	4			10	5		
1 OR 2	15	16			15	16		
NONE	8	16			6	10		
POST 37								
(a) ARTIFICIAL RESPIRATION								
ELECTRIC SHOCK			9	11			10	12
DUST/FUMES/GASES/SMOKE			11	15			5	3
CHOKE ON FOOD/VOMIT/SUFFOCATE/ FIT			4	1			2	2
WATER-DROWNING			8	6			3	0
RESULT OF INJURY			8	3			14	7
RESULT OF ILLNESS			5	1			2	8
DON'T KNOW			-	5			2	6
INDUSTRIAL			25	23			26	25
NON-INDUSTRIAL			20	9			10	7
FACTORY B ONLY								
WHETHER 'CAUSE AND EFFECT' EXAMPLE INCLUDED ON OBJECTIVE CARDS — YES			13	11				
NO			32	26				

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 37								
(b) SEVERE BLEEDING								
CUTS - GLASS			6	5			-	-
MACHINE			4	4			2	6
TOOLS/EQUIPMENT			4	3			8	9
KNIFE			5	1			4	3
SHARP METAL/OBJECT/TUBE			3	5			12	18
DRUMS			2	-			-	-
BULLET			1	-			-	-
CUTS-GENERAL			3	5			-	1
ROAD ACCIDENT			9	4			9	-
FALL (INTERNAL)			4	3			4	-
STACKER TRUCK/WAGGONS			1	3			-	-
CRUSHED UNDER LOAD/ GIRDER			1	4			-	1
ILLNESS			-	-			-	2
DON'T KNOW			-	2			2	-
INDUSTRIAL			20	20			25	37
NON-INDUSTRIAL			23	17			14	3
FACTORY B ONLY								
WHETHER 'CAUSE AND EFFECT' EXAMPLE INCLUDED ON OBJECTIVE CARDS YES			7	12				
NO			36	25				
(c) BURNS								
FIRE GENERAL			6	4			-	-
FIRE HOME			5	2			11	2
FIRE WORK			-	-			-	2
PARAFFIN			1	-			-	-
FUEL FIRE			1	1			-	-
ACETYLENE FIRE			-	-			1	-
HOT METAL			-	-			14	22
EXPLOSIONS/FURNACE BLOW BACK			2	2			-	1
PHOSPHORUS			16	17			-	-
ACIDS			10	5			5	6
CHEMICALS			8	6			-	-
ELECTRIC SHOCK			-	-			2	2
CAR ACCIDENT			-	1			-	-
HOT WATER/STEAM (WORK)			3	3			2	1
HOT FAT/ " (HOME)			-	-			2	2
DON'T KNOW			-	2			2	2

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 37 (c)cont.								
INDUSTRIAL			45	37			24	34
NON INDUSTRIAL			7	4			13	4
FACTORY B ONLY								
WHETHER 'CAUSE AND EFFECT' EXAMPLE INCLUDED ON OBJECTIVE CARDS YES			24	24				
NO			28	17				
(d) FRACTURE								
FALL GENERAL			14	11			11	9
" STAIRS			10	8			3	1
" LADDER			6	7			3	4
" SCAFFOLDING			1	-			-	-
OTHER INDUSTRIAL FALLS			3	6			7	10
OTHER NON-INDUSTRIAL FALLS			2	1			-	2
OBJECT FALL ON YOU			3	4			6	9
DRUMS HIT YOU			3	1			-	-
ROAD ACCIDENT			3	3			3	2
SPORT			-	2			3	-
OTHER INDUSTRIAL			-	1			1	1
OTHER NON-INDUSTRIAL			1	-			2	-
DON'T KNOW			-	-			4	2
INDUSTRIAL			16	19			15	24
NON-INDUSTRIAL			30	25			24	14
FACTORY B ONLY								
WHETHER 'CAUSE AND EFFECT' EXAMPLE INCLUDED ON OBJECTIVE CARDS YES			11	13				
NO			35	31				
POST 37(a)+(b)+(c)+(d) TOTALS								
INDUSTRIAL			106	104			90	120
NON-INDUSTRIAL			80	55			61	28
FACTORY B ONLY								
WHETHER 'CAUSE and EFFECT' EXAMPLE INCLUDED ON OBJECTIVE CARDS YES			55	60				
NO			131	99				

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 38 (FACTORY B ONLY)								
(a) YES			18					
NO			18					
DON'T KNOW			2					
(b) OWN COPY - YES			17					
ON NOTICE BOARD - YES			2					
NO			1					
(c) AT WORK - YES			7					
AT HOME/IN CAR - YES			8					
NO			2					
DON'T KNOW			1					
POST 38 (FACTORY C ONLY)								
(a) SEE THE POSTERS? YES							33	32
NO							4	5
(b) HOW MANY WERE THERE? 1							1	1
2							5	1
(2-3) 2½							1	1
3							3	2
(3-4) 3½							2	2
4							7	8
(4-5) 4½							-	1
5							1	1
(5-6) 5½							-	1
6							1	-
8							1	-
DON'T KNOW							11	14
CORRECT							7	8
INCORRECT							26	24

CATEGORIES		FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 38 (FACTORY C ONLY)									
(c) NUMBER OF COLOURS CORRECT	4							2	5
	3							7	2
	2							6	6
	1							9	6
	0							9	13
COLOURS CORRECT									
RED/PINK								19	14
YELLOW*								13	13
GREEN*								11	8
BLUE								7	9
OTHER COLOURS MENTIONED									
WHITE								5	6
BLACK								5	-
ORANGE								2	2
PURPLE								-	1
(d)	5							-	1
	4							-	2
	3							4	1
	2							6	3
	1							2	5
	0							1	1
	DON'T KNOW							20	19
(e) BOTH CORRECT								2	1
ONE CORRECT								3	6
NUMBER OF WRONG ANSWERS								14	20
NO IDEA								20	12
NUMBER CORRECT FOR EACH DRAWING									
PACKING CASE								5	4
STEAM PIPE								2	4

*POSTERS WITH DRAWINGS ON

CATEGORIES	FACTORY B				FACTORY C			
	VOLS PRE	NON PRE	VOLS POST	NON POST	VOLS PRE	NON PRE	VOLS POST	NON POST
POST 38 (FACTORY C ONLY)								
(f) WHAT DID POSTERS SAY? (1 MARK FOR EACH)								
4							-	-
3							-	-
2							1	-
1.5							1	1
1							1	-
0.5							4	1
NUMBER GIVING WRONG ANSWERS							11	10
NO IDEA							13	20
NUMBER OF MARKS FOR EACH SLOGAN								
FIRST AID MAKES YOU SAFER - YOU KNOW - IT MAKES SENSE (BLUE)							2	0.5
TRAINING IN FIRST AID OPENS YOUR EYES TO DANGER (YELLOW AND DRAWING)							3	0
FIRST AID MAKES YOU THINK SAFETY (GREEN AND DRAWING)							0.5	1
FIRST AID MAKES YOU SAFER - RESEARCH PROVES IT (PINK)							1	0.5

CATEGORIES	FACTORY B VOLS PRE	FACTORY B NON PRE	FACTORY B VOLS POST	FACTORY B NON POST	FACTORY C VOLS PRE	FACTORY C NON PRE	FACTORY C VOLS POST	FACTORY C NON POST
POST 39								
(a) YES			37				35	
NO			1				1	
DIDN'T GET ONE			-				1	
(b) YES			32				30	
NO			6				5	
NOT APPLICABLE			-				2	
(c) ONCE			8				3	
TWICE			10				15	
3 TIMES			5				5	
4 TIMES			3				-	
5 TIMES			-				1	
6 TIMES			1				-	
10 TIMES			-				1	
12 TIMES			-				1	
24 TIMES			-				1	
FREQUENTLY			3				3	
MEAN NUMBER OF TIMES (EXCLUDING FREQUENTLY)			2.26				3.67	
(d) YES			8				8	
NO			30				28	
(e) HEARD OF ANOTHER COURSE			3				1	
FIRST AID BOOKS			3				2	
TRAINED IN LIFE SAVING			-				2	
TRAINING IN RESUSCITATION			1				-	
ATTENDED FIRST AID LECTURES			-				1	
NEW METHODS IN PAPER			-				1	
ACTED AS CASUALTY			1				-	
IN DISCUSSION			1				-	
HEARD OF SOMEONE CARRYING OUT FIRST AID			-				1	

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OCCUPATIONAL FIRST AID: REVIEW OF STATUTORY REQUIREMENTS

Submission to the Medical Advisory Committee of the HSE

Working Party on Occupational First Aid

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We make this submission under 4 headings:

1 Basic philosophy of occupational first aid
2 Training in occupational first aid
3 Examination of occupational first aiders
4 Contents of first aid boxes

Our submission is based upon our research experience of first aid training. During our research, we have observed directly around 100 first aid courses, amounting to over 500 hours of attendance at, and recording of information from first aid classes. In addition to this, we have conducted around 400 interviews on the subject of first aid and first aid training with those who have taken such training. We are currently analysing survey findings on the subject of first aid. At a later date, we should be able to give a fuller account of our research. We have also started a series of preliminary interviews with occupational first aiders about their activities, responsibilities and views on the subjects set out above.

1 BASIC PHILOSOPHY OF FIRST AID

There is, in our view, a considerable lack of knowledge of a substantial nature about the objectives and activities of those practising first aid. The study in which we are engaged is, we believe, the first to systematically examine first aid training in detail. Even in this study we have been only incidentally concerned with the procedures and objectives of first aid. Without such knowledge we believe it is impossible to specify clearly the necessary provision of equipment and trained personnel. Two recommendations result: firstly research is essential to fill the gaps in knowledge (proposals for such research are in preparation and will be submitted to the committee in due course); secondly any regulations issued should be carefully drawn in order to allow for new knowledge as it becomes available. What is known already should be contained in notes of guidance which can be updated periodically.

The Place of First Aid

We feel strongly that first aid should be seen as an integral part of the occupational health and safety service in an organisation. There should be more communication between first aiders and the other health and safety staff involved in both prevention and treatment of injuries and disease at work. The role of the first aider in this service should be clearly defined in the organisation's safety policy, and all first aiders should be familiar with their duties. In particular first aiders can play a vital part in recording information about accidents for prevention purposes.

We also feel it is important not to lose sight of the fact that treatment of injury and illness will continue irrespective of the presence of first aiders or qualified medical staff. Individuals will always dress their own and other people's wounds and treat their own or others' ailments. The provision of statutory first aid training should be viewed against this background.

Objectives of First Aid

We can discern separate but not mutually exclusive objectives for the provision of first aid services

a) To preserve life in emergencies and to minimise the consequences of serious injury until the arrival of qualified personnel

b) To treat minor injuries which would otherwise receive no treatment, self treatment or would needlessly waste the time of qualified personnel, in order to reduce the risk of sepsis

c) As with b) for minor illnesses

d) To carry out re-dressings and other follow up treatments.

We suspect from preliminary results of our interviews with first aiders, that c) and d) form a major part of occupational first aiders activities, yet it receives little or no coverage in training.

The selection of any combination of a), b), c) and d) as the objectives for first aid will profoundly affect the provision for numbers of first aiders, the training required and the equipment to be provided. In the remainder of this submission we have arranged our comments under the two headings of life saving (objective a) and minor treatment, (objectives b,c, and d).

Numbers of First Aiders

Life Saving. We consider that numbers employed is only one, and not the most important criterion for deciding the number of first aiders. The distribution of workers in work locations and on shifts should also be considered. The crucial criterion is the time it takes for a first aider to reach any location where an emergency may occur. We suggest that the regulations should therefore specify the requirement for first aid provision in relation to work locations not numbers employed; in particular if work groups habitually go outside an organisation to work on hazardous jobs one member of every group should be trained in life saving techniques. There should be no exemption from the duty to provide life saving first aiders if a medical centre exists in the organisation staffed by qualified personnel.

The requirement for numbers of first aiders should also be increased where there are serious hazards and where an accident could give rise to large numbers of casualties at one time.

We have evidence from our studies that there is an advantage to the overall level of safety of an organisation in training all employees in life saving techniques, but we appreciate that this evidence should not affect the level of statutory provision of first aiders.

We see three elements in the skill of first aid: diagnosis, practical treatment skills, and disposal of the casualty with the necessary information accompanying it for the purpose of further treatment, and of accident prevention. All these elements should be present in the training course.

Minor Treatment. The training for first aiders who will do treatment of minor injuries and illness should include a much broader spectrum of knowledge, including the dangers of giving patent medicines to certain groups of people, the rudiments of diagnosis of signs of more serious disease which should be referred to a qualified doctor, and information on redressing. More research is needed to find out what first aiders already do, in order to assess the extent of training they need under this heading.

Organisation of Training

All Training. First aid training should be seen as a part of the overall training an employee receives under Section 2(2)(c) of the Health and Safety at Work etc Act 1974. It may be of added benefit if first aid training is given at the same time as safety training. This is a subject which our current research is examining.

The quality of training depends partly on the instructors giving it, (see below) but also upon the time and equipment available. This is particularly true where practical skills are to be learned. For example it is impossible to teach external cardiac massage in under 15 minutes per candidate. For this reason we strongly recommend that class sizes where such techniques are taught be kept to a maximum of a dozen per instructor so that all candidates can practice the skill. In addition it is impossible to teach the ECM technique without a Recording Resusci-Anne, therefore classes should not be allowed to take place unless such equipment is available. Similar strictures apply to other practical techniques.

More information is needed specifically upon the effectiveness of various techniques of training, class sizes and length of courses. Some information on these topics may emerge from our research, but special studies would yield more information.

Minor Treatment. If this is the objective of the provisions, we agree with the present formula for calculating numbers of first aiders and of allowing exemptions on the grounds of the presence of a staffed medical centre, provided that centre is staffed at all times when people are working.

2 TRAINING OF FIRST AIDERS

Selection of First Aiders

Life Saving. Thought should be given to the selection of people who will be capable of becoming certificated first aiders. Some life saving techniques are strenuous and are beyond the capacity of the old or infirm. First aiders are also required to take charge in emergencies: this requirement should rule out the unintelligent, the indecisive and those pressed into doing training against their will. Such factors could be judged when the candidate is examined for the certificate.

Content of Training

Life Saving. There should be a standard core of first aid techniques taught, which form the certificated course. Additional techniques appropriate to specific risks in each organisation should be added on to the course where those risks are high enough, or where a special risk, however remote requires particular emergency treatment. These additional hazards and treatments should be taught only by someone with experience of the industry, since, in our experience those without that experience may actually do more harm than good. These additional skills could be the subject of endorsements to the standard certificate.

We are aware that there is some dispute over the inclusion of particular techniques in training courses. External cardiac massage is one such technique. We think that a decision on its inclusion (and the inclusion of other treatments) should be based on concrete evidence of the number of cases where it would be needed, the benefits and dangers of the treatment, and the difficulty of using it correctly. This seems to be another area where systematic research is needed. If the decision is made to include a technique, adequate time should be allowed for it to be learned thoroughly, and proper equipment should be available to teach it.

In addition, the conditions for a licence to issue instructors' certificates should be the possession of people capable of giving training in instruction techniques.

HSE should monitor the licences, issued by random sampling of instructors courses, as well as satisfying themselves that the conditions for issue, set out above, have been met.

3 EXAMINATION OF FIRST AIDERS

Content of Examination

All Training. The examination should be linked to the detailed objectives of the first aid course. All aspects of the course should be examined, the diagnosis, the practical skills and the disposal of the patient and attendant information provision. Pencil and paper techniques alone are therefore not sufficient. All candidates should have to demonstrate their ability to carry out all of the standard practical first aid techniques, on equipment provided, or where appropriate on a person. This applies particularly to the life-saving techniques. The examination should therefore be long enough (at least 15 minutes) to allow for this. The examiner should also be permitted to fail a candidate if he is not satisfied that the person could safely be trusted to take charge in an emergency.

Status and Conduct of the Examination

All Training. It is important that the candidates should be, and be seen to be, thoroughly examined, not only to keep up the standard of first aid, but also to bolster the confidence of the first aider in his own abilities and to convince him that he is doing a responsible and professional task. In addition re-examination (see below) acts as a valuable one-to-one refresher for the candidates.

The formal examination should be the culmination of continual assessment of the trainee throughout the training course, by the instructor. Thought should be given to the merits and demerits of an examiner independent of the course instructor, but we would strongly urge that all examiners should be holders of instructors certificates.

Quality of Instructors

All Training. We feel strongly that the training of first aid instructors should be given much greater priority than hitherto. Our experience shows that there is a wide range of ability, and much low quality among existing instructors. Only a small proportion of first aiders are likely to make good instructors. An instructor not only needs a wider knowledge of first aid than a first aider, but also the ability to instruct. Indeed our experience shows that for teaching emergency procedures a high level of first aid knowledge may be a handicap to proficient training, and ability to instruct is at a premium.

We suggest that no one should be allowed to instruct, not even a doctor or nurse, unless they have passed a training course in instruction techniques. In addition instructors should have a sound knowledge of any special hazards included in the course - as stated above in the section on Context of Training.

Monitoring, Licencing and Certification

All Training. In order to maintain the quality of first aid training we suggest that the Health and Safety Executive should monitor the organisations providing training at all levels, and the training that they provide. We suggest that HSE should do this by licencing organisations to provide certificates in first aid, and in first aid instruction. (The two sorts of certificate might with benefit be issued by different organisations, for example, educational establishments might provide instructors courses, since they have the skill to teach the techniques of instruction. In any event licencing for the two sorts of certificate should be separate, since some organisations would not want to issue instructors' certificates). With this proviso we consider that many more organisations, particularly large employing organisations should be encouraged to run and examine their own first aid courses.

The conditions for issue of a licence to certificate first aiders should be the possession of a cadre of certificated instructors, and of the necessary training equipment. In addition the certificating organisation should have a system of monitoring the quality of its instructors' courses. The issue should be conditional on running a minimum number of courses a year so that instructors are always in practice.

Frequency of Examination

All Training. We feel that re-examination should take place as frequently as possible as part of the continuous monitoring of health care. Where the first aider is part of a professionally staffed occupational health service this re-examination can take place informally as the service monitors adequacy of treatment, recording of information and first aiders' knowledge and skill.

Formal re-examination should take place as follows;

Life Saving Cardio pulmonary resuscitation techniques require frequent revision, probably at 6 monthly intervals, although more research is needed to assess how fast the skill decays. At the least yearly re-examination is essential.

Minor Treatment and Other Life Saving

Other techniques need less frequent re-examination and we have no evidence to dispute the present 3 year interval. In order to save time we suggest that refresher training need only take place before every other examination.

Failure of examination

All Training. Failure in the examination will not guarantee that someone will not practice first aid thereafter. We see no way of achieving this prohibition. We do, however recommend that failure should place an obligation on the candidate to take another course as soon as possible, preferably to be examined by the same examiner, so that it is clear that the shortcomings have been rectified. In the meantime the person should be relieved of all official first aid duties.

Certificate

All Training. The certificate issued should be a standard one from all issuing bodies, and should be fully transferable, so that its possession allows access to instructors' and advanced courses run by any organisation.

4 CONTENTS OF FIRST AID BOXES

We have little to say on this matter, since we have not studied it directly. However the following observations follow from our previous statements.

Life saving Techniques require little or no equipment apart from bandages, and slings. We suggest therefore that emergency boxes, perhaps secured against pilferage by means similar to fire exits, should contain only those items.

Minor treatment Boxes for such purposes should be kept in the possession of the certificated first aider. In such an instance there would be little need for including first aid instructions in the box. The contents should be suited to the training and needs of the particular first aider. We think it unwise to prohibit items which any research showed were already regularly used unless there was overwhelming reason, since the consequence would almost certainly be that the item would still be retained and stored in a less hygienic place.

Access to surgeries We have become aware through our studies that first aiders are not uncommonly left in charge of surgeries when the qualified staff are not on duty. They then have free access, so they inform us, to many items of equipment and even laboratory chemicals. We feel that such situations may lead to their enthusiasm overcoming their training, and to them overstepping their knowledge and authority. Thought needs to be given to the desirability of control of such situations.

FIRST AID TRAINING: DOES IT REALLY MAKE YOU SAFER?

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PART 1: THE FACTORY STUDIES

(Paper submitted to Occupational Safety and Health, March, 1978.)

A research team from The Safety and Hygiene Department at The University of Aston in Birmingham led by Dr. Ian Glendon have been monitoring the progress of a St. John Ambulance sponsored project called First Aid Community Training (UK). This project - FACT(UK) - is an important piece of research into the effects of first aid training on safety.

In this, the first of two articles, the authors discuss the findings and conclusions from three factory studies conducted by Stephen McKenna. These studies were the prelude to a community study which are discussed in next month's issue. *The authors gratefully acknowledge the help of their sponsors - St. John Ambulance. They would also like to thank those at the factories whose invaluable assistance made the research possible, and colleagues in the Department of Safety and Hygiene who commented upon earlier drafts of this article.*

THE CANADIAN RESEARCH HISTORY OF THE PROJECT

It is an established belief of first aid practitioners that, following training in first aid, people are less likely to have accidents than before such training. This belief led the Workmen's Compensation Board of Ontario to sponsor a study into the relationship between first aid and safety in the community of Orillia in Ontario, Canada.

Although the full results from the community study are still not accessible, findings are available from a contemporaneous survey of large industries throughout Canada (Miller and Agnew, 1973). In particular, data from the Bell Telephone Company showed that people trained in first aid had consistently fewer reported injury accidents than people not trained in first aid. Accident records from the Ontario Northland Railway showed that trained people had up to 40% less accidents. These findings led to further intensive first aid programmes being set up in other locations in Canada, including Cambridge and Guelph.

An appraisal of the evidence by Atherley et al., 1973 revealed that the Canadian study had not set out to control for risk exposure, nor to collect pre-training injury accident data from the industries studied. Also Canadian first aid training differed significantly from the general first aid training in this country. For these reasons, plus the difficulty of applying the Canadian results directly to the United Kingdom because of differences in social systems, it was decided to carry out a similar study in this country using strict experimental techniques in order to confirm or otherwise the Canadian findings.

THE RESEARCH AT FACTORY A

An important research move was to express the research hypothesis in a verifiable form. In the light of the Canadian work the following hypothesis was proposed and was termed the major hypothesis: 'that first aid training reduces people's involvement in injury accidents'. There was little choice but to concentrate on accidents leading to injury because official reports and other statistics relate predominantly to accidents where there has been personal injury. In the factory studies reported here use was made of the number of first attendances at a surgery following an injury at work.

The results from the first factory study (Factory A) showed little support for the major hypothesis. No change was found in the accident rates of the trained group, or in their reported behaviour towards danger. However, clear changes were found in attitudes towards injury and its consequences, indicating an increased awareness of these in the trainees. There were, however, less clear-cut changes in attitudes to risk and danger. The superficial interpretation of these results was that the first aid training had increased the motivation to be safe, but that this had not been followed by a change to reported safer behaviour.

THE METHOD USED AT FACTORIES B AND C

It was possible to suggest four main reasons for the differences between the Canadian findings and those from Factory A:

(1) the training courses used in Canada were longer,

(2) there are cultural differences between Canada and Britain,

(3) there was a strong safety orientation in the Canadian training, including the use of 'cause and effect'* examples, and

(4) propaganda was used in Orillia relating first aid to safety and invoking civic pride as a motivation to be safe.

For the factory studies lengthening the training would have proved too expensive and it was impossible to overcome the second factor, the cultural differences. Furthermore, it was necessary to avoid specific safety training the investigation of any possible causal relation between *first aid* and accident involvement. However, it was possible to include 'cause and effect' examples in the training. Relevant examples were developed for use at Factory B from analysis of the type of injuries noted in the accident book and by observation of processes and jobs undertaken at the plant.

* 'Cause and effect' examples relate the treatment of an injury to a possible cause or causes of that injury. For example, in descriptions of the treatment of unconsciousness it may be stated that the condition (effect) could result from a blow on the head or a fall from a ladder (cause).

At Factory C, first aid propaganda was used in association with the first aid training. This propaganda consisted of posters which were displayed around the factory following the pre-training interviews, and removed before the post-training interviews. They carried slogans such as "First aid opens your eyes to danger", and two of them had line drawings showing a worker trained in first aid taking positive action to avoid a hazard.

THE DESIGN OF THE STUDIES

The first stage was to discuss the project with management and, at Factory B, with union representatives. Various forms of publicity were then used to attract volunteers for training. The publicity concentrated on the accepted benefits of first aid training and made no reference to safety. Once sufficient numbers had been obtained, each volunteer was matched with another employee who had not volunteered for training. Matching was made on the following criteria: (i) type of job done, (ii) length of service on that type of job, (iii) age, and (iv) nationality. Matching was carried out so as to ensure as far as possible that the trained and untrained groups were exposed to the same level of risk while at work.

From the list of volunteers and their controls, 39 pairs at each factory were selected for interview prior to training. Pairs were selected to represent different parts of the works so that a general picture of the factory could be obtained.

Following the pre-training interviews the volunteers received their first aid training. The course lasted four hours and the most satisfactory method of organisation was found to be two sessions of two hours separated either by two days or a week (dependent on the shift systems in operation). Trainees attended classes during their normal working hours.

Approximately six months after the training, interviews were again carried out. As far as possible the same employees were interviewed. However, it was necessary to replace some pairs with matched pairs who had not previously been interviewed owing to sickness, redundancy or non-attendance at first aid classes.

The interviews were designed to measure knowledge of, and attitude towards, first aid, injury, risk, and danger. They were also used to look at other specific areas such as history of injury, attitudes towards accident reporting, and behaviour relevant to safety.

The matched pairs (including those who were not interviewed) were used for the analysis of the injury data obtained from the surgery attendance records. A comparison was made of each individual's injury accident performance for about one year before training, and for an equal period after training. In this way it was possible to make a 'before-and-after' study of injury accident performance.

THE FIRST AID TRAINING

The course taught was based on the St. John Ambulance 'Digest of First Aid' and concentrated on basic life-saving techniques. Because of the pilot-study nature of this phase of the research the training programme was refined and improved after the study at Factory B, and more effort was put into training the instructors.

Training was limited to those first aid techniques within the capabilities of course members, and which could be adequately taught within the time limits of the course. The course was designed to include as much practical work as possible in order to maintain attention and interest, and because first aid is essentially a practical subject. Technical terms and jargon were kept to a minimum; explanations were kept as simple as possible. In order to allow sufficient individual attention and to ensure comprehension, class sizes were kept to an average of five trainees.

The topics covered in the training at Factory B were as follows: (1) principles and practice of first, (2) structure and function of the body, (3) breathing and resuscitation (including external cardiac massage), (4) wounds and bleeding, (5) shock, (6) unconsciousness, (7) injuries to bones and joints, (8) burns and scalds, and (9) poisons. At Factory C the structure and functions of the body were omitted because it was felt that such detailed information was beyond the scope of a basic life-saving first aid course. External cardiac massage was also omitted because the technique could not be adequately taught in the time available.

RESULTS FROM FACTORIES B AND C

The analysis of pre-training injury accident data showed that at both factories the volunteers for training had a significantly worse record than the matched control group. This evidence appears to contradict any prediction that people who volunteer for first aid training are already safer. Responses from the interviews suggested that the observed differences in injury accident rates were not due to the volunteers' reporting more of their minor injuries than the non-volunteers. There was no evidence from the interview data that the volunteers were more safety motivated than the non-volunteers. There was evidence, however, that the volunteers were already more aware of danger than the non-volunteers.

The injury accident data analysis showed that, following training, there was no significant difference between the groups in their injury accident performance at either factory. At Factory C this change was the result of a statistically significant reduction in the number of injury accidents suffered by the trained group. At Factory B there was only a slight improvement in the injury accident rate of the trained employees, but the injury accident rate of the matched control group deteriorated. These two movements combined produced a relative shift in accident rate, similar to that which occurred at Factory C.

FINDINGS FROM THE INTERVIEWS

The main findings from the interviews were:

(a) The first aid knowledge of the trainees increased.

(b) Trainess became more convinced of the value of first aid training.

(c) There was little change in the trainees' awareness and perception of injury and its consequences.

(d) There was little increase in the trainees' awareness of danger, although at Factory B they rated their likelihood of injury higher following their training.

(e) There was some evidence that the trainees rates more accidents as preventable.

(f) There was evidence that the trainees rates themselves relatively more responsible and management less responsible for the prevention of accidents than they had prior to training. (This finding suggests that the trainees would be more likely to adopt safer behaviour).

(g) The volunteers became more motivated to adopt safe behaviour.

(h) At Factory C there was evidence that the trainees adopted safer behaviour.

(i) The trainees claimed to be more willing to report minor injuries to the surgery. (This finding was important because it strengthened the findings from the injury accident data; it is probable that the increased reporting level of the trainees led to an underestimate of the actual improvement in injury accident rate for this group.)

CONCLUSIONS FROM THE STUDIES AT FACTORIES B & C

The findings that attitudes to risk and danger did not change and that trainees became more motivated to adopt safe behaviour suggest that first aid training motivates people to avoid injury rather than to become more aware of danger. The pre-training differences between volunteers and non-volunteers indicates that the former group were already more aware of danger and risk and yet had a worse injury accident record. It seems that first aid training introduces the concept of injury and its consequences to trainees in an acceptable form, and this may act as a motivator to avoid injury.

In industry the information necessary to avoid injury should be readily available to all workers (indeed this information provision is now a legal requirement). This a worker motivated to avoid injury by first aid training should possess the necessary knowledge to be safer or should be able to find out how to become safer. Safety training, information and propaganda together with first aid training would therefore be expected to influence injury accident rates.

Because of the pilot-study nature of the project and the fact that the training course was different at each factory it is difficult to determine the influence of the 'cause and effect' examples used at Factory B, and the effects of first aid propaganda used at Factory C. Evidence from the interviews suggested that neither the 'cause and effect' examples nor the first aid propaganda greatly influenced the first aid training.

The implications of these findings for first aid training are importnat: a training course which combined both first aid training and safety training could be expected to both motivate workers to be safer and also to instruct them in correct safety procedures. Hence, the already strong case for widespread first aid training, particularly in industry, is further strengthened.

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